

SOUTHERN POWER AND INDUSTRY

Vol. 1, No. 12 DECEMBER, 1951

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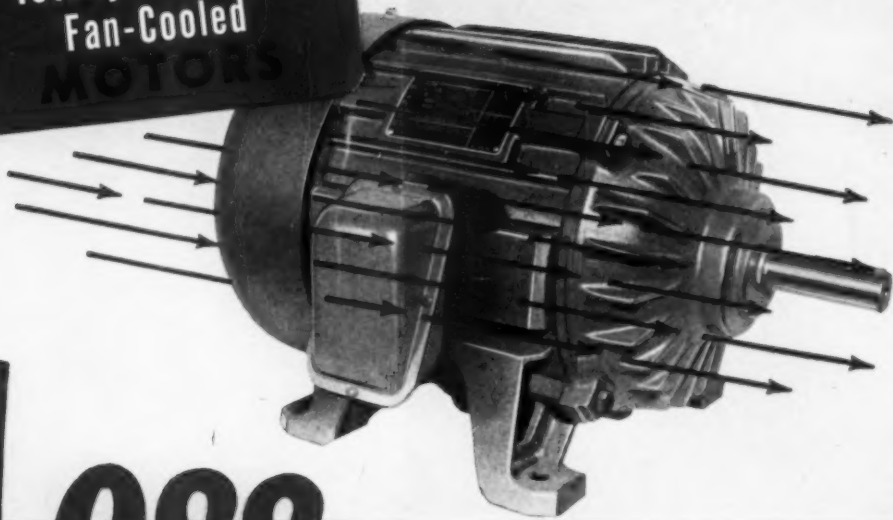
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Totally-Enclosed
Fan-Cooled
MOTORS



LESS MOTOR CLEANING ... INSPECTION ... OVERHAUL!

HERE'S A MOTOR that actually blows itself clean! Dirt is carried away by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor.

Dirt can't build up to cause overheating. Concealed air passages and pockets have been eliminated. Even oily dirt that sticks can simply be wiped or blown off.

And this means savings! Maintenance costs are traditionally low on totally-enclosed, fan-cooled motors. But they're lower than ever before on the new Allis-Chalmers Type APZ tefc motor.

Rigid Construction

The frame is cast iron which has high

resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed, fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

A-3426

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CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.



PUMPS — Integral motor and coupled types from 3/4 in. to 72 in. discharge and up.

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

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Volume 69

Number 12

How to **INCREASE BOILER RATINGS**

with your present
furnace and stack

*Coppus-Dennis FANMIX Burners Give You
More Heat with No Other Major Change
in Equipment*

Coppus-Dennis FANMIX Burners give you *perfect* mechanical mixing of fuel and air at the burner outlet . . . *instantaneous* ignition close to the burner . . . and *complete* combustion *without visible flame* when burning natural gas. No other burner combines these three advantages.

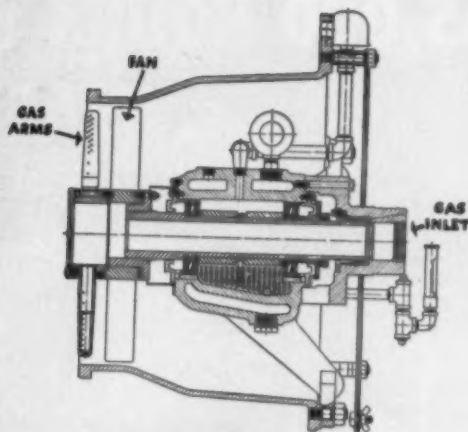
Because FANMIX delivers the *right* mixture of fuel and air *without blow-torch action*, all of your furnace space is used for combustion . . . *none for mixing*. That's why your present furnace can release more heat . . . why new installations can get more heat out of smaller furnace space.

Because FANMIX can be guaranteed to secure complete combustion of natural gas with *less than 5% excess air*, you get uniform "radiant heat" *without drifting hot spots*. That's why a FANMIX-fired furnace seldom varies in temperature more than 5% over its entire area.

WRITE FOR ALL THE FACTS

When you see in Bulletin 410-5 how fuel escaping from orifices in rotating driver arms rotates the fan to draw the correct proportion of air into the path of the fuel at right angles . . . how FANMIX creates its own forced draft, reduces stack requirements, prevents cracking of "wet" gas . . . how two FANMIX types handle either gas or oil or any combination of both — you'll understand why FANMIX Burners have such wide acceptance in oil refineries and power plants.

Send for the Coppus-Dennis FANMIX Bulletin 410-5. Coppus Engineering Corporation, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, and REFINERY CATALOG.



ANOTHER
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"BLUE RIBBON" PRODUCT

COPPUS ENGINEERING CORP.
252 Park Ave., Worcester 2, Mass.

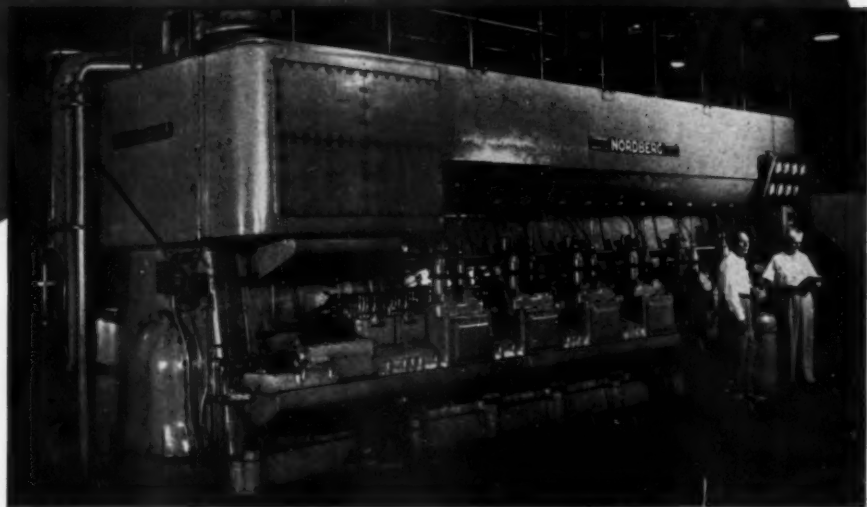
Please send Bulletin 410-5 to:

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Company

Address

65,000 HOURS OPERATION —WEAR NEGLIGIBLE



City of Greenville Diesel turns in impressive 5-year record lubricated with TEXACO URSA OIL

This Nordberg 2,400 h.p. Diesel engine was installed in the municipal power plant at Greenville, Texas, in 1946—and has been lubricated continuously with *Texaco Ursa Oils* in both crankcase and cylinders. G. C. Pullen, Master Mechanic, reports on its condition at the latest inspection—

"We took the engine down at about 65,000 hours' operation. When we miked the cylinders, the greatest amount of wear found was only .018"—and that at only two points. Most of the measurements ranged from .008" to .015"—an average of only .0002" wear per 1,000 hours of operation. Furthermore, in No. 1 cylinder the original rings, delivered on the engine in 1946, were found to be in such good condition they were placed right back in service."

☆ ☆ ☆
Count on *Texaco Ursa Oil* to give your Diesels the

clean operation that means less wear, less maintenance cost, less fuel consumption. *Texaco Ursa Oil* is highly resistant to oxidation . . . keeps rings free, valve action smooth and snappy. Assures longer life for bearings and all moving parts. In two-cycle engines, ports stay clear.

There is a complete line of Texaco Diesel lubricating oils approved by leading Diesel engine builders and preferred by operators everywhere. In fact—

*For over 15 years, more stationary Diesel
b.p. in the U. S. has been lubricated with
Texaco than with any other brand.*

Call in a Texaco Lubrication Engineer for full details. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO URSA OILS

FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

SOUTHERN POWER AND INDUSTRY

DECEMBER
1951

NBP



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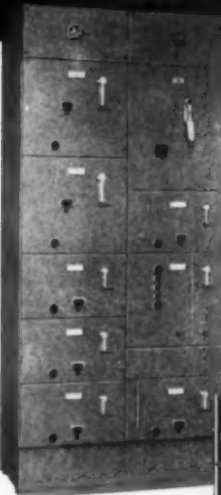
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HOW to Centralize Your Motor Controls with Sectionalized Multi-Unit Panels



- Centralized operation
- Greater safety
- Lower maintenance cost
- Improved appearance
- Adaptable to changes

Ideal for remote control of motors which require starters with special types of enclosures.

Equipment Available



Combination Starters

- Across the line—fusible—with disconnect switch.
- Across the line—with circuit breaker.
- Reversing—fusible—with disconnect switch.
- Reversing—with circuit breaker.
- Multispeed—fusible—with disconnect switch.
- Multispeed—with circuit breaker.

Other Control Units

- Reduced voltage—autotransformer starter—with circuit breaker.
- Main incoming line circuit breaker or disconnect circuit breakers or fusible disconnect switches for feeder circuits, lighting panels, and transformers.
- Accessories, such as push buttons, selector switches, pilot lights, auxiliary contacts, control relays, control transformers, and special assemblies.

Individual vertical sections consist of flanged side plates rigidly joined by cross member. A 4-inch wireway runs vertically through each section and connects with bus bars at top. Please write for Bulletin 798.

Allen-Bradley Co., 1328 S. Second St., Milwaukee 4, Wis.

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CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

December, 1951

GOT A POWER SUPPLY PROBLEM in these days of expanding production? C. E. Kietzman, chief engineer of the Dewey Portland Cement Co. of Dewey, Oklahoma found that load-center distribution played an important role in his recent power modernization program. Two existing generators couldn't furnish enough power to meet expanding needs. A local utility could supply it but Dewey couldn't handle the additional power because of inadequate switchgear.

Waste heat from the company's cement kilns had enabled them to generate most of their power with two turbine-generators. Enough additional waste heat was available to economically install a 5,000 kw G-E turbine generator. Along with the new turbine, Dewey utilized modern switchgear and by employing load-center distribution eliminated tremendous quantities of heavy-low-voltage copper conductors. Mr. Kietzman will report on his solution to the plant's critical power supply problem in the January issue of SP&I.

WHY NOT RECLAIM THAT OIL MIST from high speed cutting and grinding machine operations? It's hazardous and daily recovery in a large operation can be as great as five gallons. In the new precipitator of Trion, Inc., oil mist is charged as it passes through the electrostatic field and then attracted to plates of opposite polarity from which it eventually drains into collecting pans for ultimate reuse.

THE BEST PLANT IMPROVEMENTS, insofar as return on investment is concerned, are frequently small in capital cost. Their incorporation into the plant is more of a strain on the brain than on the pocket-book. SP&I's October BETTER PRODUCTION issue cited 88 case histories on what has actually been accomplished through moderate improvements in specific Southern and Southwestern plants. In this issue, Robert J. Tucker, plant engineer of Roanoke Mills, Roanoke Rapids, N. C., again emphasizes that anything that can improve production only a little is of big value in overall plant economy. The company's dye house has been falling behind production of the mill, necessitating considerable overtime operations on week ends. Mr. Tucker improved his water supply and lowered dyeing costs. A plant investment of \$3,000 resulted in annual savings of \$25,000 — or a return on the investment of 800 per cent.

HOW OFTEN DO YOU HAVE TO CLOSE SMALL VALVES some 10 to 50 ft above the floor? Several plants report the successful application of the impactor handle of Edward Valves. Handle delivers 2.8 times the force of conventional handwheels and by adaptation to small chain-wheels gives operators the benefit of extra torque.

USE OF FORCED AIR SYSTEMS AS AN EXPEDIENT TO COOL CABLES in generating plants where capacity has been increased, has been reported by one large utility. Faced with the problem of modernizing plants to increase capacity, engineers had the choice of adding ducts, changing size, type and number of cables, or using metal clad bus on the one hand or of installing forced air cooling to absorb higher cable losses.

The cooling was applied to generator units and also on bus tie-in circuits, station runs of tie feeders and various other circuits where cables were operating above prescribed temperature limits. Another installation was made in an underground run in a generating station yard where hot-spot conditions prevailed.

SERIES 600 - CHROME CARBIDE, introduced by Carboly Department of G. E. at the October Metals Show, is lighter than tungsten carbide (the nearest comparable metal) and has vastly greater resistance to abrasion, corrosion and erosion. It is completely non-magnetic and resists oxidation at temperatures up to over 1800 F. It contains practically no tungsten or cobalt, both highly strategic materials.

CHANGE FROM AIR TO HYDROGEN GENERATOR COOLING, introduced about 16 years ago, accomplished a 20 to 30 per cent boost in ratings for an equivalent frame size. Allis-Chalmers' engineers state that their new **SUPERCHARGED GENERATOR** has raised ratings an additional 70 per cent without any increase in the amount of active material required. One new design, rated 60,000 kw, 12,500 v, 3600 rpm steam turbine driven generator, was installed in mid-summer and is now in operation.

Weight and length reduction is achieved by forcing hydrogen at much higher velocity than has been used before, directly over surfaces of the current-carrying copper conductors of the rotor. In addition to normal fans for circulating the hydrogen, the new generator has a two-stage centrifugal compressor mounted at one end of rotor shaft supplying gas to the rotor. To get the heat out of the rotor faster, the A-C design has specially shaped copper windings through which cool hydrogen travels at high speed. Hydrogen is cooled by conventional water-to-hydrogen exchangers.

UNUSUAL AND PRACTICAL WAYS OF DOING THE JOB with moderate labor and material expenditure is receiving wide attention as a means of plant operating improvement. Emphasis on practical, how-to-do-it ideas was noted in comments by Ben Askew, power consultant of the Georgia Power Company at the November Southeastern Electric Exchange meeting in New Orleans. The following are a few of the many power applications and equipment trends cited by Mr. Askew.

CONSIDER NEMA DESIGN F MOTORS, which have a low starting torque with unusually low starting current. For instance, a 30 hp, 220 v motor has a normal locked rotor current of 435 amp, while in the Design F motor, it is 270 amp. Its use, particularly on centrifugal equipment, can often allow full voltage starting and save delay and expense in securing reduced voltage starting equipment.

CONSIDER INTERNAL HEATING, where the equipment is energized with low voltage and becomes the heating medium (fluid heating in pipes or drying clay and sand for screening, when the screen acts as the heater, are typical examples). When the amount of heat required has been determined, take the resistance of the equipment to be used as a heater and determine the amount of current and voltage which will be necessary. Safe maximum voltage between conductors or to ground — probably 25 v.

CONSIDER NEW WELDING TECHNIQUES, such as — — — submerged arc welding (where granulated flux pours over the arc and shields it, giving more uniform and sounder weld) now available for manual operation . . . the high efficiency transformer with its low no load losses, has been combined with the metallic direct current rectifier to use a 3 phase supply and deliver d-c, with the resulting welding advantages . . . small arc welder using only around 800 watts, fills cracks and holes in iron and steel castings (electrode "punches" cracks full of metal rather than maintaining steady arc).

CONSIDER DRILLING METHODS — where units operate as arc welding apparatus but are used for drilling holes. Drill press type machine is used and low voltage applied between what would be a drill and material. Instead of rotating, drill mechanism vibrates up and down. Using d-c, approximately 200 amp are drawn between drill point and work. Operation gradually jabs a hole through most any metal.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.

Class I Accuracy in these G-E Regulators —at no extra cost

GENERAL ELECTRIC'S TYPE IRS induction voltage regulators provide the finest regulation obtainable for heavily loaded, urban feeders.



GENERAL ELECTRIC'S TYPE MLT three-phase 32-step regulators are available in standard ratings for circuits up to 25,000 kva and 69,000 volts.

This means better utilization of your feeders . . . they can now carry heavier loads for greater distances.

Because of today's increasing power demands on your feeders, General Electric is especially proud to be the leader in bringing you this significant new system design tool at **NO EXTRA COST!**

The controls on all station-type feeder voltage regulators now meet rigid ASA Standards for Class I devices. This means that they have an accuracy of at least 99%—regardless of operating changes in temperature, frequency, or load.

With these highly accurate controls on your regulators, more drop can be tolerated in a regulated feeder without at any time exceeding established voltage limits. Therefore your older feeders can carry heavier loads and your new construction can be designed with this increased load-carrying capacity in mind.

For further information on what Class I accuracy can mean to you, get in touch with your G-E representative. *General Electric Company, Schenectady 5, New York.*

434-62

GENERAL



ELECTRIC

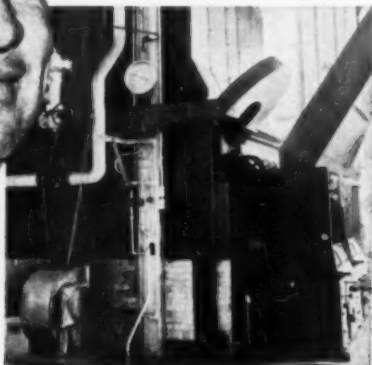
How an Engineer Slashed Operating Costs **46% with coal!**



Fred Koenig's notes (below) were incorporated in his report to the Wagner Brewing Co., Columbus, Ohio in October, 1951.

IN FIRST YEAR OF OPERATION, NEW POWER PLANT EVEN BETTERS FRED'S ESTIMATE!

Fred Koenig calculated a saving of \$40,000. When the figures were in—after the first full year of operation—the saving actually amounted to \$44,730!



Here's the coal-fired installation that engineer Koenig recommended, after carefully considering gas and oil as fuels. Specifically designed to get the most energy from today's coals, it saved the Wagner Co. \$22,730 on fuel alone in the first year!



This large-capacity silo feeds coal automatically to the Wagner Company's power plant. It cuts handling costs—permits bulk buying of coal at lower rates—assures the Wagner Company of a steady, dependable source of power!

★ ★ ★

Cost of new power plant . . .	\$128,000
Coal tonnage (old plant) . . .	8,420
Coal tonnage (new plant) . . .	4,700
Fuel costs (old plant)	\$ 54,730
Fuel costs (new plant)	\$ 32,000
Yearly savings on fuel	\$ 22,730
Labor costs (old plant)	\$ 41,496
Labor costs (new plant)	\$ 19,496
Reduction in present labor costs	\$ 22,000
Yearly savings	\$ 44,730
Amortization time, new power plant—2 years, 11 months.	

Fred Koenig
CHIEF ENGINEER
OHIO LICENSE


Today, bituminous coal, when used with modern equipment, is the most economical fuel for industrial use. Coal is now more efficient because it's *prepared* . . . cleaned of all impurities. Modern equipment adds from 10% to 40% to the power obtained from the same amount of coal in years gone by.

And automatic controls, together with modern coal- and ash-handling apparatus, have dramatically reduced labor costs, done away with inconveniences—making bituminous coal the best industrial fuel by far!

America's coal mines are so productive that there will be no shortages to plague the companies that use coal for power . . . America's ample supply of coal is the best possible assurance that the price of coal will remain more stable than those of other fuels. Coal is always the safest fuel when it comes to both storage and use, factors of more than usual importance in these unsettled times.

BITUMINOUS COAL INSTITUTE

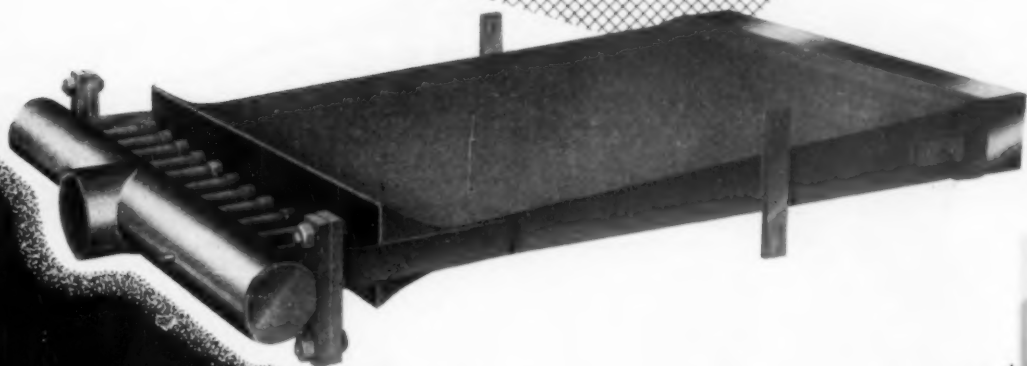
A Department of National Coal Association, Washington, D. C.

FOR HIGH EFFICIENCY  FOR LOW COST

YOU CAN COUNT ON COAL!

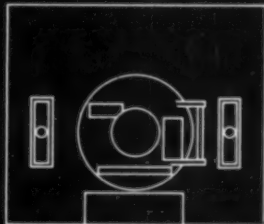
Another

WEBSTER FIRST



WEBSTER RECTILINEAR Gas Burner

○ For gas firing $\frac{\text{over}}{\text{beside}}$ stokers and oil burners



FIRING IN A VERTICAL PLANE ON EACH
SIDE OF A ROTARY CUP OIL BURNER



FIRING IN A VERTICAL PLANE ON EACH
SIDE OF A STOKER HOPPER

Now available after almost three years of operating tests and installations having capacity of 1,242,000,000 Btu/hr. at 10 psig.

This unique application of the *Venturi* principle has resulted in a high input burner that can be installed through *very* narrow rectangular furnace openings.

It is recommended for inter-tube firing; firing in a horizontal plane through small openings over coal grates; firing in a vertical plane on either side or on a horizontal plane over a stoker or oil burner; and also for use in all types drying kilns.

It is small in size, and light in weight, with excellent turn-down without flash back; stable flame retention even at high inputs—low noise level.

Write for Series B22 Bulletins.

The WEBSTER ENGINEERING COMPANY

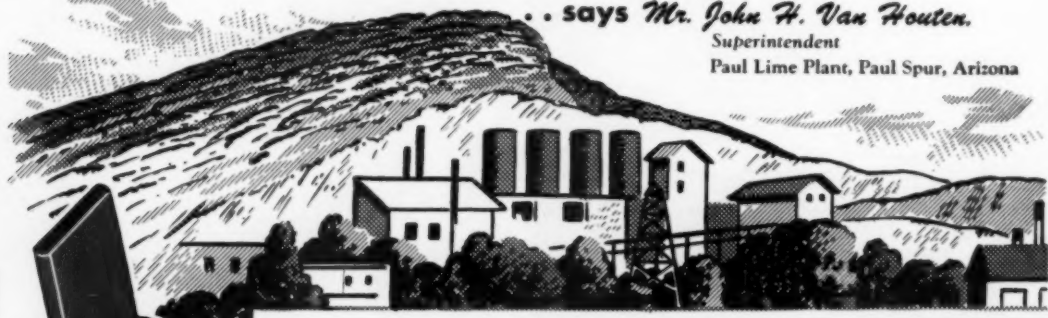
TULSA, OKLAHOMA

Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

**"The cost of changing to
FUSETRON dual-element FUSES has been
paid for more than ten times over
in sustained production time"**

*... says Mr. John H. Van Houten,
Superintendent*

Paul Lime Plant, Paul Spur, Arizona



HERE'S HOW

"Prior to February, 1948 we used ordinary renewable fuses throughout our plant. They gave us short-circuit protection but we lost a great many motors due to single phasing, excessive heating and climatic conditions.

"When a motor goes out in a plant like ours, it costs us a loss in production that is difficult to make up.

"In February, 1948 we changed the whole plant over to Fusetron fuses. On the motors we installed a size to give motor running protection.

"We have completely eliminated motor losses due to single phasing and believe we have better all-around protection than before.

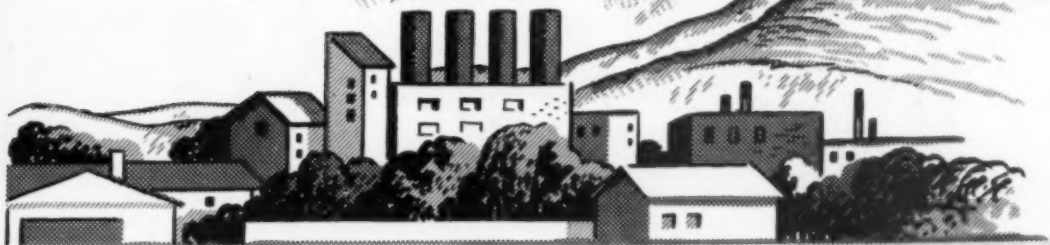
"Our records show that the cost of changing to Fusetron fuses has been paid for more than ten times over in sustained production time.

"What more could we ask?"

John H. Van Houten

(Fusetron is a trade mark of the Bussmann Mfg. Co.,
Division of McGraw Electric Co.)

You Too, Can Cut Production Losses and Save Many Times Their Cost by Changing to FUSETRON dual-element FUSES



HERE'S WHY

FUSETRON dual-element FUSES GIVE 10 POINT PROTECTION

- 1* Protect against short-circuits.
- 2 Protect against needless blows caused by harmless overloads.
- 3 Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.
- 4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.
- 5 Protect motors against burnout from overloading.
- 6 Protect motors against burnout due to single phasing.
- 7 Give DOUBLE burnout protection to large motors — without extra cost.
- 8 Make protection of small motors simple and inexpensive.
- 9 Protect against waste of space and money — permit use of proper size switches and panels.
- 10 Protect coils, transformers and solenoids against burnout.

DON'T RISK LOSSES!

One **lost** motor . . .
One **needless** shutdown . . .
One **destroyed** switch or panel
One **burned out** solenoid . . .

May cost you far more than
replacing every ordinary fuse
with a
Fusetron dual-element Fuse.



USE THE COUPON

*Fusetron fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December 1947.

Bussmann Mfg. Co.,
University at Jefferson,
St. Louis 7, Mo.
(Division of McGraw Electric Co.)

Please send me complete facts about FUSETRON dual-element fuses.

Name _____

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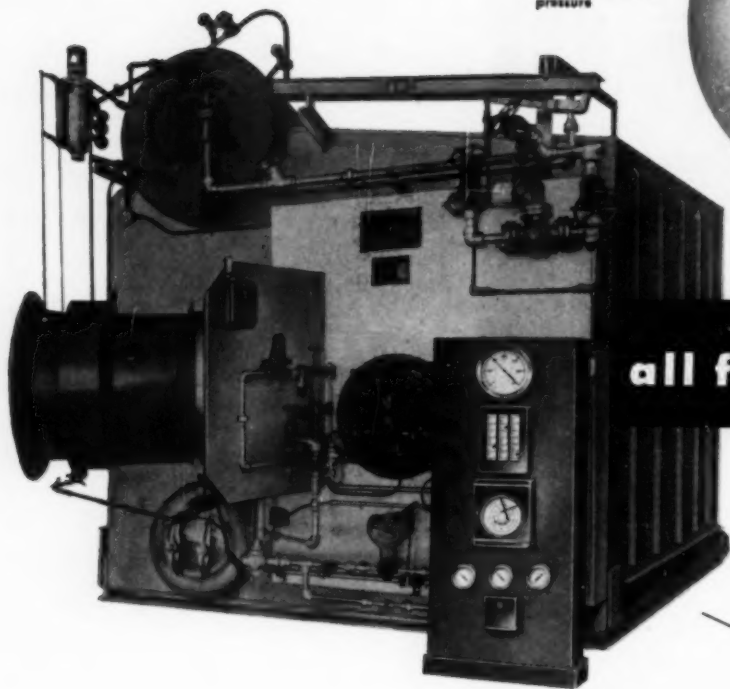
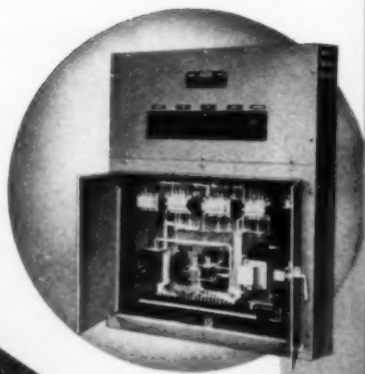
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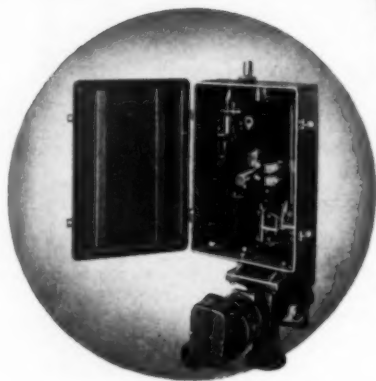
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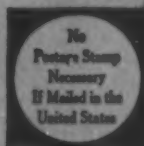
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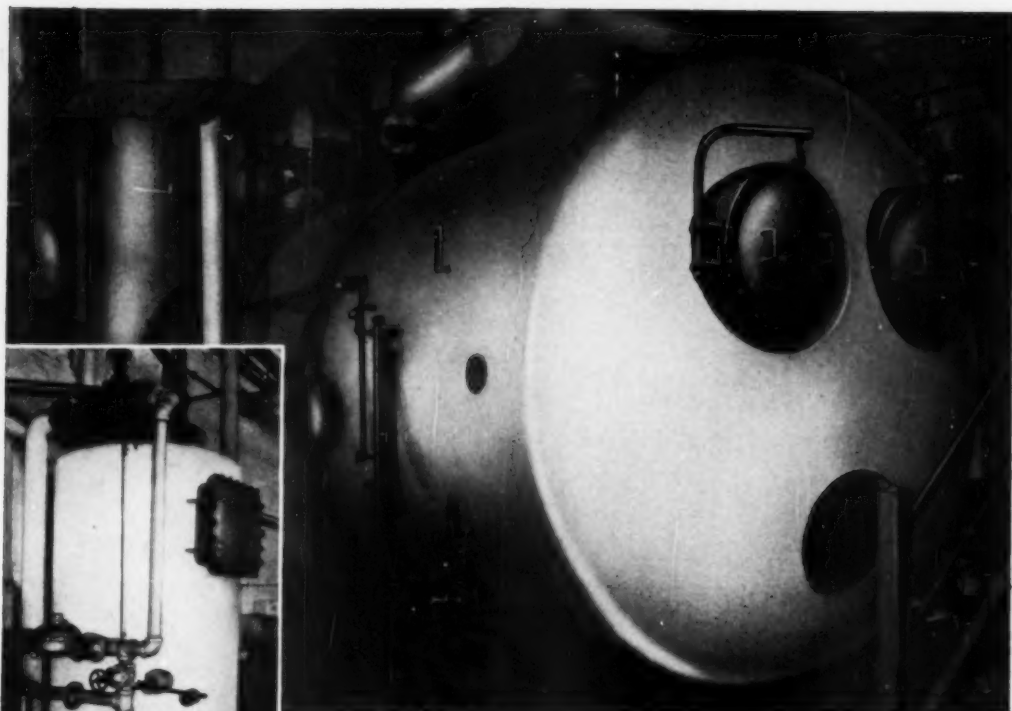
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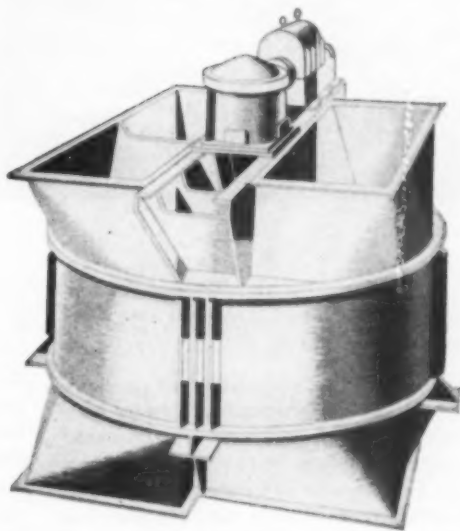
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If you are planning a new installation, or expanding your present one, our engineers will welcome the opportunity to show you how the Ljungstrom air preheater can raise the overall efficiency of your plant.

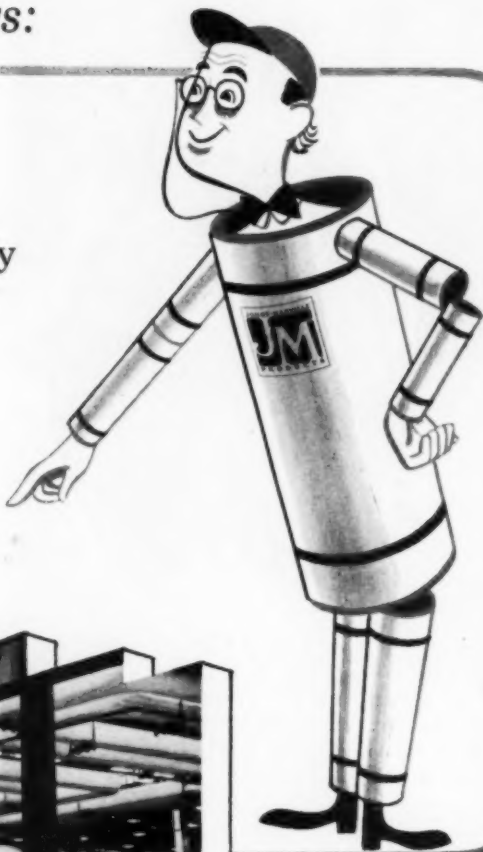
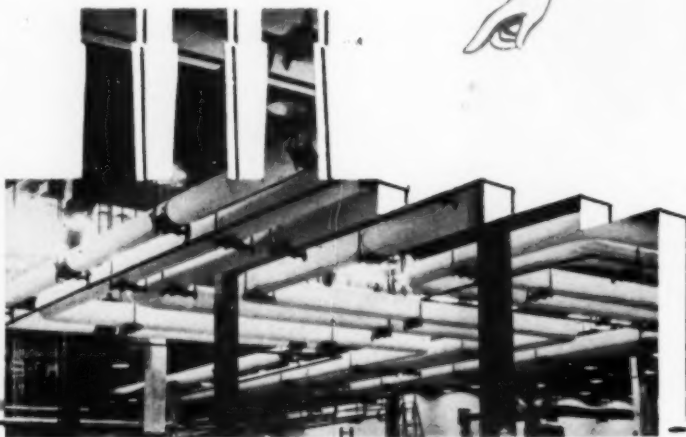


THE AIR PREHEATER CORPORATION

60 East 42nd Street, New York 17, N. Y.

Mr. Insulation says:

"We haven't found a substitute yet for the right materials, properly applied, to make an insulation investment pay off"



To be successful an insulation job must be properly engineered. In addition, it must have these two important ingredients:

1... THE RIGHT MATERIALS: service conditions vary greatly in industrial applications. That's why no one insulation can serve as a jack-of-all-trades on all jobs. For this reason, Johns-Manville uses asbestos and many other selected raw materials to produce the most complete line of insulations available. These insulations serve applications ranging between the extreme tem-

peratures of 400F below zero to 3000F above.

2... THE RIGHT APPLICATION: Here again Johns-Manville's long experience in the field of insulation can be of value to you. Insulation engineering advice plus the services of insulation contractors trained in Johns-Manville methods of correct application are at your call.

If you are planning an insulation job why not put your problem up to insulation headquarters? Write Johns-Manville, Box 290, New York 16, N. Y.

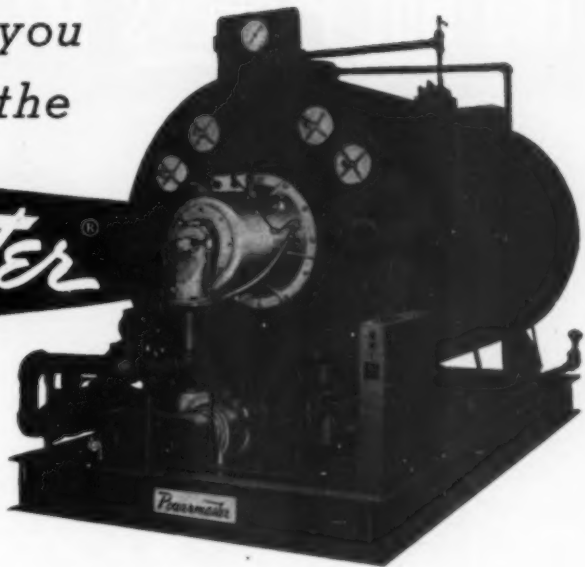


Johns-Manville *first in* **INSULATIONS**

to get all **3** benefits
be sure you
find out about the

Powermaster[®]

Model 3 Powermaster—15 to 500 H.P.—high or low pressure units for steam or hot water



- 1** Low cost operation for steam or hot water—because the special Powermaster burner design (patent applied for) gives you top efficiency when operating anywhere between 30% and 100% of boiler capacity.
- 2** Less clean-up time and money are real benefits when you use a Powermaster. In plant after plant, job records prove that the design of this packaged steam generator means less smoke, less soot to be cleaned from tubes.
- 3** Get low fuel rates by changing from either gas or oil in just a few minutes. You can use the cheaper fuel at any time. And no worries about fuel shortages, either.

To find out what is new and better about the Powermaster, all you do is ask for a copy of Bulletin 1218. It gives you complete details about this unit's improved safety and automatic control features. Ask us to put a copy of Bulletin 1218 in the mail for you.

We'll mail you a copy of this book that gives the reasons why you cut operating costs with the Powermaster. Just ask for a copy of Bulletin No. 1218.



ORR & SEMBOWER, INC., Established 1885
910 Morgantown Road, Reading, Pennsylvania

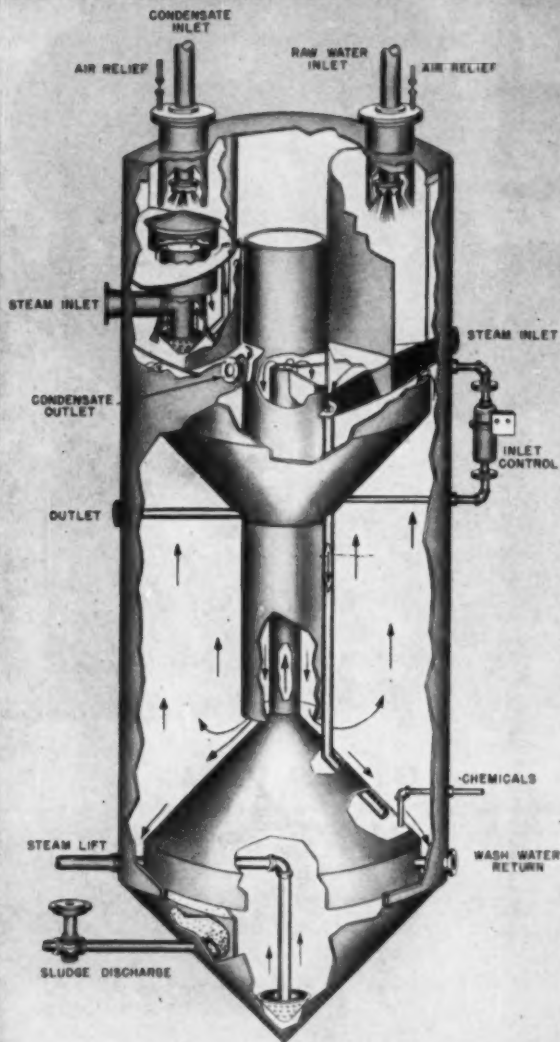
SOUTHERN POWER & INDUSTRY for DECEMBER, 1951

only the
dependable

Powermaster[®]
gives you
all 3

—for steam
or hot water
at low cost

The Hot Process ACCELATOR[®]



MULTI-PASS TREATMENT FOR

- Softening
- Silica Reduction
- Deaeration of Makeup and Condensate



HERE'S THE ANSWER TO 3 OF THE POWER ENGINEER'S MOST COMMON PROBLEMS

SOFTENING: Positive internal slurry recirculation insures maximum softening, alkalinity reduction, and turbidity removal with a minimum of chemical expenditure. A steam lift effects the recirculation thereby eliminating mechanical pumping devices. A storage compartment within the tank holds sufficient treated water to handle momentary peak demands.

SILICA REDUCTION: Prolonged contact of the water undergoing treatment with the recirculating slurry as well as the redissolving of magnesium in the slurry, reduce silica to a new low.

DEAERATION: The steam lift effectively deaerates the makeup water undergoing treatment, thereby eliminating the need for separate deaerating mechanisms. The condensate enters a separate chamber in the upper portion of the tank and is recycled and scrubbed by its own steam lift system.

Check these advantages of the Deaerating Hot Process Accelator: 1. Self-contained deaeration for both makeup and condensate, 2. Controlled slurry recirculation, 3. Maximum silica reduction by the redissolving of magnesium, 4. Reprecipitation for chemical economy, and 5. An efficient low in turbidity, alkalinity, and hardness. Investigate the new Deaerating Hot Process ACCELATOR. Write for complete information, now.

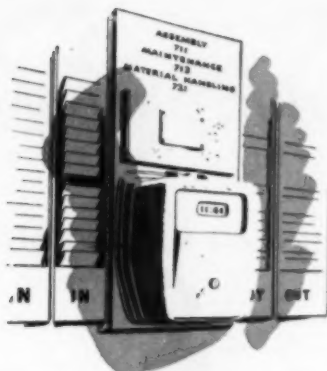


INFILCO INC.

NEW YORK 17 • TUCSON • CHICAGO 16

SALES OFFICES IN TWENTY SIX PRINCIPAL CITIES

WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING EQUIPMENT



A BOILER THAT PUNCHES THE TIME CLOCK

Yes — a Cleaver-Brooks Boiler “Punches In” to meet a heavy steam demand — “Punches Out” during low load periods.

Steam costs can eat deeply into profits when steam loads fluctuate — or are intermittent. With a Cleaver-Brooks boiler you are equipped for heavy or light . . . steady or variable loads, operating at full 80 per cent efficiency over the entire working range of the boiler.

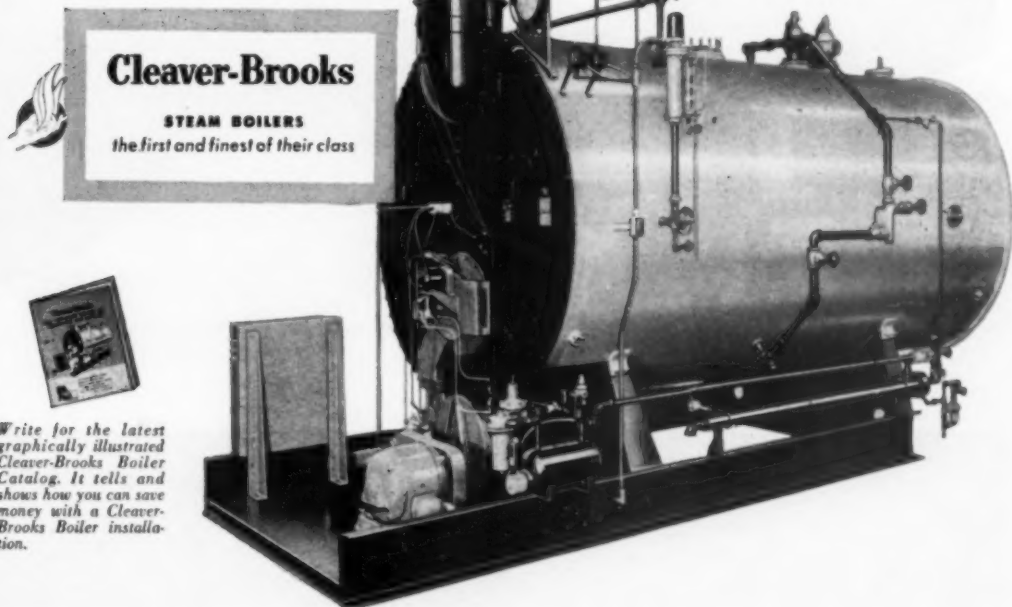
You are assured of fuel economy through high heat transfer. All Cleaver-Brooks boilers are of the four pass design and the maximum useable

heat is absorbed in these four passes before the combustion gases leave the boiler.

Remember the name Cleaver-Brooks if you are considering a change in your present boiler plant. Think about flexibility and get the complete facts about Cleaver-Brooks Self-Contained Boilers — standard models in 15 to 500 HP, 15 to 250 psi, oil, gas, combination oil and gas fired — 80 per cent efficiency.

CLEAVER-BROOKS COMPANY

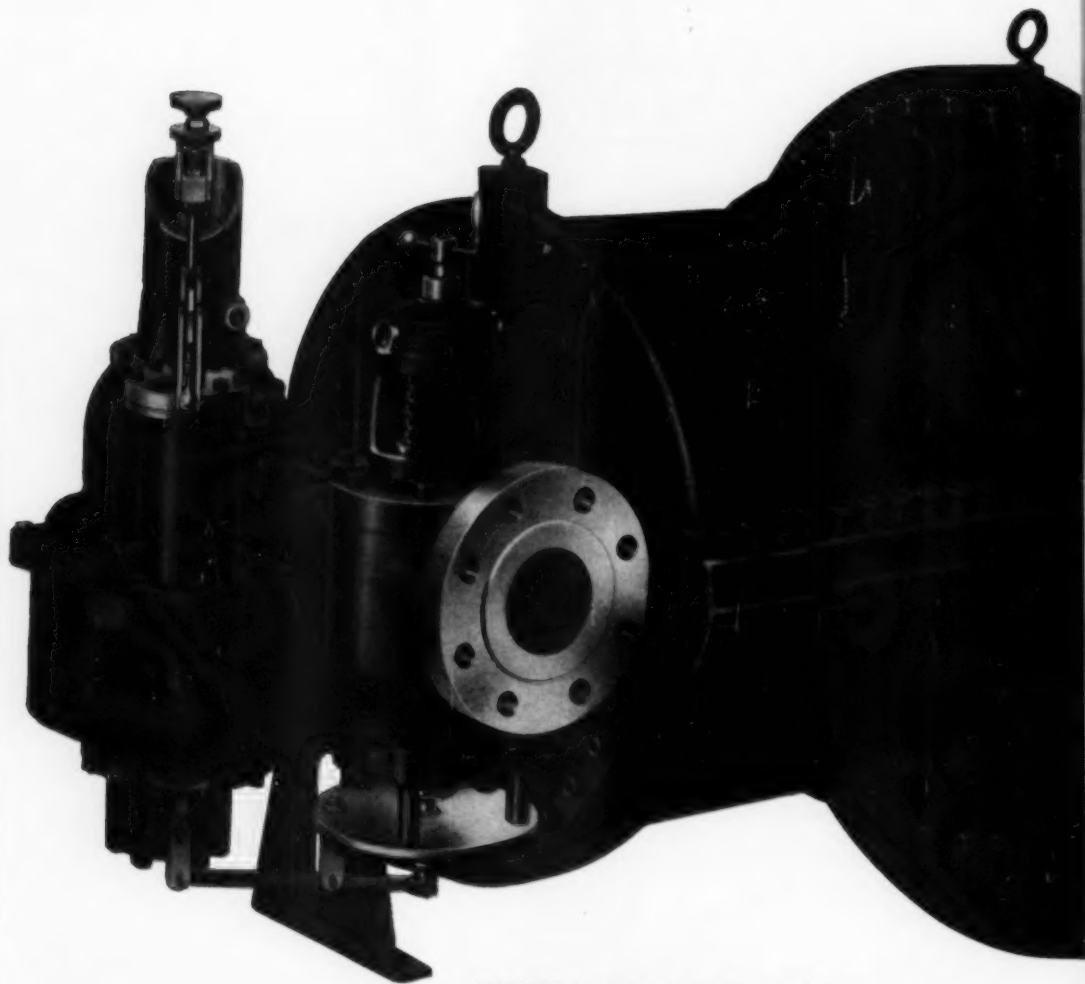
305-S, E. KEEFE AVE., MILWAUKEE 12, WIS.
Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners



Write for the latest graphically illustrated Cleaver-Brooks Boiler Catalog. It tells and shows how you can save money with a Cleaver-Brooks Boiler installation.

GENERAL ELECTRIC ANNOUNCES

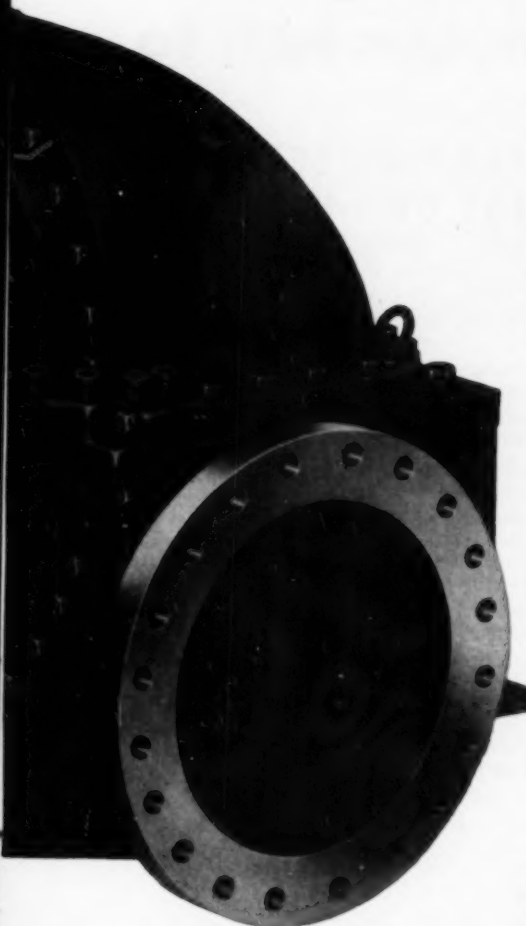
New



TYPE DR for wide adjustable-speed range

Multi-Stage Turbines

Available in Four Designs—200 to 5000 hp



Now in production! General Electric's completely new, multi-stage turbine drives . . . designed to give you maximum mechanical power for every fuel dollar . . . available to meet any mechanical drive application where efficiency and reliability are "musts."

FOUR NEW TYPES—The DP, DR, DRV, DRVX—incorporate the newest ideas in improved turbine design. Four different governing systems give you a wide selection of performance ratings for either condensing, noncondensing or automatic extraction applications.

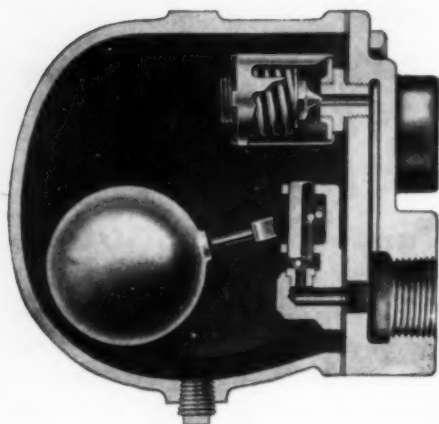
NEW FEATURES that spell increased economy and reliability are built into General Electric's new multi-stage turbines. A completely new sectional valve gear, for instance, gives you greater efficiency for part load operation. Refinements in governing, lubrication and steam chest design make these the finest mechanical-drive turbines General Electric has ever produced.

A NEW TECHNIQUE of manufacturing from standard, interchangeable patterns promises you savings in initial investment and shortened delivery time. You get a custom turbine, designed for your job, built from standard parts.

Get the full particulars on these brand new multi-stage turbine drives. Write for your copy of our new bulletin, GEA-5580, "G-E Multi-Stage Turbine Drives." Section 252-52, General Electric, Schenectady 5, N. Y.

252-52

GENERAL  **ELECTRIC**



COMMON SENSE approach to

TRAP SELECTION FOR UNIT HEATERS

what

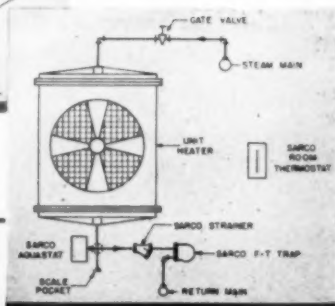
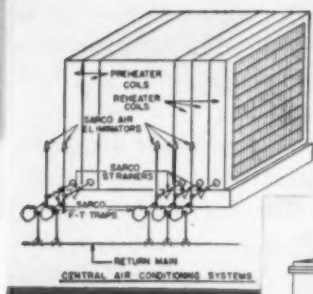
are the requirements for efficient
unit heater or blast heater drainage?

why

is the Sarco type F.T. the ideal steam
trap for such heaters?

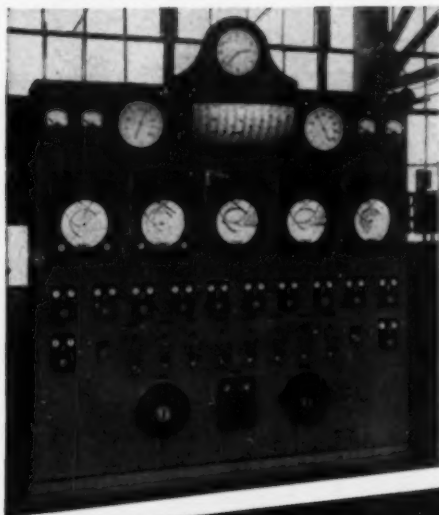
1. High starting load capacity to deal with cold air and low steam pressure resulting from peak load.
2. Free discharge of incondensables on starting and during running.
3. Continuous condensate discharge to prevent hot and cold air blasts.
4. Release of condensate at or near steam temperature.

1. The float operated main valve can be sized to handle the condensate loads from the lowest pressures up to maximum design pressure.
2. The built-in air vent prevents air binding under starting or running conditions.
3. Sarco F.T. traps discharge condensate continuously, as soon as it forms—don't need to cool or to wait until steam leaks out of buckets before they fill and discharge.
4. The float level and, therefore, the valve opening is controlled by the rate of condensate flow into the trap. On no load, the valve is closed.



*New Bulletin 455 contains full
information on latest improvements.*

SARCO COMPANY, INC.
EMPIRE STATE BUILDING, NEW YORK 1, N. Y.
Represented in Principal Cities
SARCO CANADA LTD., TORONTO 5, ONTARIO



This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

- 1. Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.
- 2. Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.
- 3. Direct Sales-Service—conveniently located near you.** Bailey Meter Company's sales-service engineers are located in more

industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-112-1



BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants

COMBUSTION • FEED WATER
TEMPERATURE • PRESSURE
LIQUID • LEVEL • FEED PUMPS

This man ...

SOLVES YOUR INVENTORY PROBLEM!



Inventory often is too little and too late or too much and too soon. It ties up money needed for operating expenses or it ties up the plant by lacking things it should supply.

There is a man in your locality who will finance your inventory. He has at all times approximately \$500,000,000 invested in the tools, equipment and materials you need. He will gladly and promptly supply from his large local stocks many things which you frequently and urgently need. Why not get better acquainted with this man.



Creditable

"This man" is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

There are approximately 2,000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than \$5,000,000,000. They carry an average inventory of \$500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.



Bunting®

BRONZE BEARINGS
BUSHINGS
PRECISION BRONZE BARS

THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

Copyright 1950 By The Bunting Brass & Bronze Company, Toledo, Ohio
SOUTHERN POWER & INDUSTRY for DECEMBER, 1951

New . . . DuraCut Abrasive Discs

**1/8" THICK
yet
flexible**



*Blending weld on
stainless steel tank.*



*Smoothing weld
bead.*

IF YOU'RE LOOKING for a BETTER WAY...

. . . to blend welds and similar jobs, at a lower cost with greater productivity, investigate the vast possibilities of DuraCut Abrasive Discs. These new multiple layer abrasive discs, are *flexible, strong, safe*, offering many advantages over the ordinary single layer type of coated discs.

- MAXIMUM FREEDOM OF CHIP DISPOSAL (segment patterned)
- INCREASED LABOR SAVINGS (less disc changing)
- FASTER, SUSTAINED RATE OF CUT (built to grinding wheel specifications)
- 10-25 TIMES LONGER LIFE (over 1/4 million more cutting particles)
- WITHSTAND LONG CONTINUED FLEXING (extra matted reinforcing)

***The only really flexible
grinding wheel
ever offered!***

Order Today for a Trial:

Sizes available for immediate shipment
 $7 \times \frac{1}{8} \times \frac{7}{8}$ } In any of these
 $9 \times \frac{1}{8} \times \frac{7}{8}$ } grit sizes: 36, 54, 80

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
 Distributors — All principal Cities
 In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ontario



*Removing rust and
scale.*

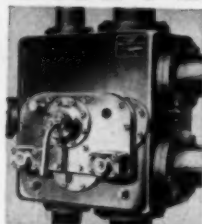


*Removing weld
spatters.*

ONLY COCHRANE ZEOLITE SOFTENERS and FILTERS

have the
**HYDROMATIC
SINGLE CONTROL
VALVE**

Below is shown
a Hydromatic
Valve ar-
ranged for
automatic
opera-
tion.



ONE important feature of Cochrane Zeolite Softeners and Filters is the Hydromatic Single Control Valve replaces the usual "valve nest" or rotary disc single control valves of other equipment. It has the following advantages:

1. It is pilot-operated... easy to operate.
2. Soft, single-seated individual valves insure drop-tightness.
3. Six positions—four normal, one shut-off, one for draining.
4. Individual valves easily accessible and replaceable.
5. Automatic and adjustable backwash and rinse controls eliminate need for concrete sumps.



Exploded view of
Hydromatic Valve
with Front Distributor
detached showing
detail of valve.



Write for a copy of this
32-page publication

(No. 4520) describing not only the Cochrane Hydromatic Single Control Valve, but a detailed description of Cochrane Sodium Zeolite Softeners. A separate publication (No. 4530) describes Cochrane Hydrogen Zeolite Softeners. Mention which type you are interested in.

COCHRANE CORPORATION

3101 N. 17th Street, Philadelphia 32, Pa.

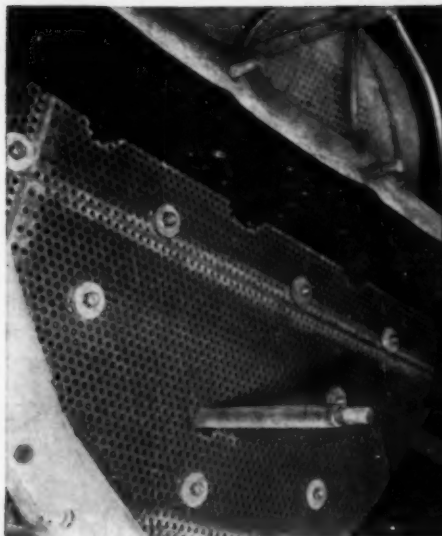
In Canada: Canadian General Electric Co., Ltd., Toronto

In Mexico: Babcock & Wilcox de Mexico S. A. Mexico City

In Europe: Recuperation Thermique & Epuration: Paris

COCHRANE





6 Steam Condenser Specialties

Steady Performance

Air erosion eliminator installed on C-3 Cargo vessel. Perforated baffle plates in first condenser pass with collecting tubes and manifold are shown.

Which of These Useful First-Aid Items Does Your Plant Need?

Described below are seven steam condenser specialties developed by Conesco engineers to simplify maintenance and step up performance.

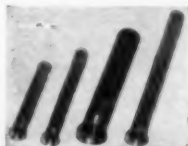
1 Wizard Injector • Condenser tubes are subject to corrosion and erosion which may develop small leaks in the tube walls. To plug these leaks while the condenser is in operation, Conesco has produced the Wizard Injector. Operated by steam, this device introduces a special compound into the inlet circulating water which seals the leaks; avoids shutdowns between normal inspection and cleaning periods.



Wizard Injector

2 Air Erosion Eliminators • This simple apparatus, perfected by Conesco, completely liberates air from water before it enters the tube. It consists of perforated plates which induce turbulence in water as it passes through perforations; may be fitted in condensers having one, two or more passes.

3 Flowrites • In installations where it is impractical to fit an Air Erosion Eliminator, air erosion of the tube inlets can be combated by the use of Flowrites, sometimes called "inserts" or "wearing sleeves." They serve as replaceable wearing sections; are fitted to the inlet ends of tubes for distances depending on length of attacked tube section.



Flowrites of various sizes

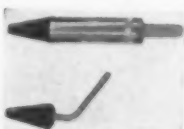
4 Plugs for Condenser Tubes

• Use of right plugs will help keep condensers going until there is time for a complete overhaul. Conesco engineers have developed plugs of machined fiber which give full satisfaction. They are installed with light hammer tap.



Fiber Plugs

5 Detect-A-Leak • To simplify tube testing, Conesco offers the Detect-A-Leak. It consists of a solid rubber plug for one end of tube, hollow rubber plug for opposite end. Leak in tube wall collapses rubber nipple on hollow plug. These dependable test kits available from stock in all standard sizes.



Detect-A-Leak

6 Conco Gun • For cleaning inside tube surfaces of slime, algae or soft scale deposits Conesco recommends the hydraulically operated Conco Gun and Plug. Trigger releases a jet of water which forces a metal spring leaf plug through the tube. Plugs come in all standard tube sizes.



Conco Gun and Plugs

Items 1, 4, 5 & 6 in stock for all standard tube sizes. Items 2 & 3 MADE TO ORDER FOR QUICK DELIVERY, raw material held in stock.

WRITE FOR BULLETINS—It will pay you to get further information about these first-aids to continuous condenser operation. Check items of interest and we will send descriptive bulletins.





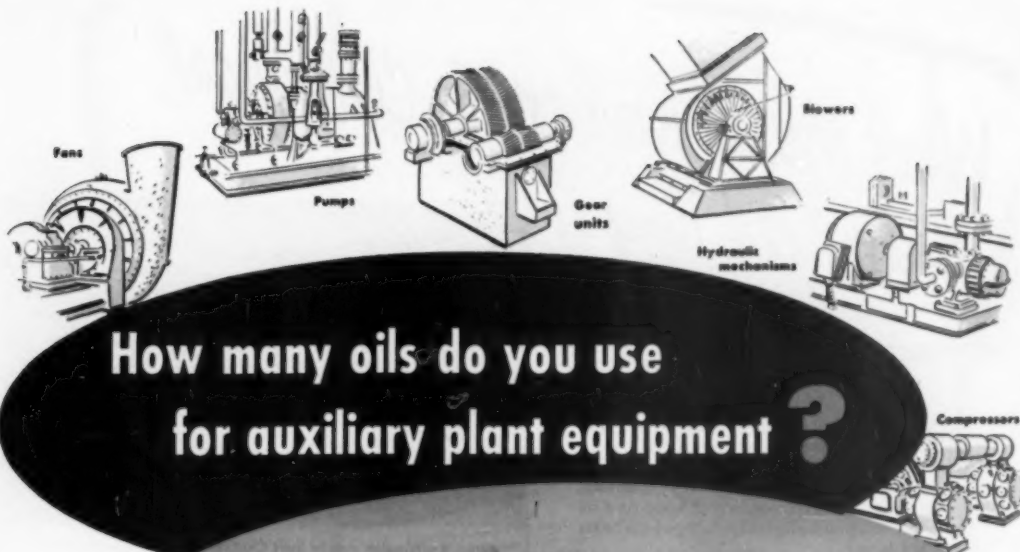
IT TAKES ALL THREE!

To handle big power piping jobs efficiently it takes all three—unusual plant equipment . . . exceptional field organization and facilities . . . and top-notch heavy piping experience.

When plans call for extreme pressures and high temperatures, when space limitations complicate installation, when special alloys or complicated fabrications must be used, Power Piping Division will give you the job you want!

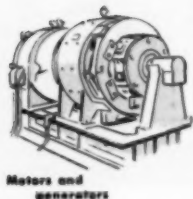
BLAW-KNOX POWER PIPING DIVISION
OF BLAW-KNOX CONSTRUCTION COMPANY

1525 Pennsylvania Avenue, Pittsburgh 33, Pa.



How many oils do you use
for auxiliary plant equipment ?

**You need only
GULF HARMONY OIL**



**-Outstanding many-purpose
oil for equipment like this!**

You can lubricate all your plant auxiliary equipment better with just this one oil—Gulf Harmony Oil. It's equally effective for sleeve-type and antifriction bearings, hydraulic mechanisms, compressor cylinders, and many types of gears.

Here are a few of the many reasons why Gulf Harmony Oil performs so well in so many different applications. First, it has high resistance to oxidation and the formation of sludge. In oil circulating systems, reservoirs, hydraulic systems, and antifriction bearing pedestals, this means freedom from harmful deposits and insures against premature oil changes.

Then the lubricating film provided by Gulf Harmony Oil has preferential wetting characteristics for metal—it displaces moisture, interrupts its corrosive action. That's how this quality oil prevents rust on all oil-bathed surfaces—a particularly important function in precision hydraulic valves and in antifriction bearings operating under damp conditions.

And because it has good water-separating characteristics, there is less chance of emulsification and the useful life of each fill is prolonged.

Gulf Harmony Oil is available in a wide range of viscosities and is inhibited to provide more effective protection against wear under boundary conditions.

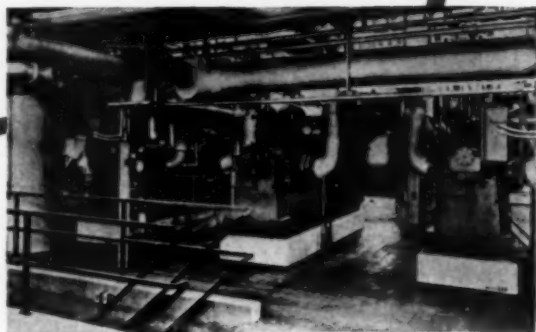
For further information on Gulf Harmony Oil and for expert help on your lubrication problems, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company,
Gulf Building, Pittsburgh 30, Pa.



What Metals Are Best For Centrifugal Boiler Feed Pumps?

Drawing on their long experience in the field of hydraulics, Worthington engineers produce boiler feed pumps that are metallurgically correct in design, meeting every requirement as to temperature, pressure and corrosion-erosion resistance. As a result, Worthington boiler feed pumps perform better and last longer.



Three Worthington Axially Split Centrifugal Boiler Feed Pumps At The Kansas Power And Light Company Plant, Hutchinson, Kansas.

The following table represents Worthington's recommendation of materials:

Casing	Fittings	Maximum Temperature	Use
1. Cast Iron	Bronze	250 F	pH neutral to 8.5 pressures under 1000 psi unless water is known to have corrosive action.
2. Cast Iron	13% Chromium Stainless Steel	350 F	Any pH, but at pressures under 1000 psi unless water is known to have excessive corrosive action.
3. Carbon Steel	Bronze	250 F	Seldom used for boiler feed service — only where water is definitely known not to be corrosive.
4. Carbon Steel	13% Chromium Stainless Steel	400 F	pH above 8.5, and only where water is definitely known not to be corrosive.
5. 5% or higher Chromium Steel	13% Chromium Stainless Steel	Any temperature normally encountered	Any pH and where water is corrosive or previous trouble reported.

This proven selection of materials coupled with the most advanced design, superior workmanship and a thorough knowledge of application show why . . .

THERE'S A RIGHT WORTHINGTON PUMP FOR YOU

. . . right for the pressure and temperature of your boiler feed service . . . right for maximum economy and dependability. For further proof that *there's more worth in Worthington*, contact our nearest District Office, or write to *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

One of Several Solid Barrel, Radially Split, High Pressure Boiler Feed Pumps at the Trenton Channel Station of the Detroit Edison Co.



WORTHINGTON



**THE WORLD'S
BROADEST LINE
ASSURES YOU THE
RIGHT PUMP FOR
EVERY JOB**

For Boiler
Feed Service
Capacities
to 1500 GPM
Heads
to 1000 Ft.



For Hotwell,
Condensate,
Chilled Water
Service
Capacities
to 1400 GPM
Heads to 650 Feet



For Boiler
Feed Service
Capacities
to 1500 GPM
Heads
to 1600 Feet



For Water Works,
Circulation,
Drainage,
General Service
Capacities
to 135,000 GPM
Heads to 400 Feet



For Boiler
Feed Service
Capacities
to 1600 GPM
Heads
to 3500 Feet



For Boiler
Feed Service
Capacities
to 3000 GPM
Heads
to 7000 Feet



We're keeping our promise!

"...to keep pace
with the increasing
transportation needs
of the South."

Diesels for Dixie!

Diesel locomotives...the dollars...don't grow on trees. These 603 powerful Diesel units the Southern Railway System now has in service and on order cost about \$50 million!

That's a lot of money. But it bought a lot of modern horsepower...to give a modern fast-growing Dixie the best in transportation.

These "Diesels for Dixie" are just one indication of our determination to keep pace with the increasing transportation needs of the South.

To do this we believe in the future of Dixie. Faith in the bright future of Dixie. Faith that some day soon our country will issue, in the public interest, that all forms of commercial inter-city transportation must stand independently on their own financial feet...without support from the taxpayer...as only the railroads now do.

Ernest E. Harris
President



SOUTHERN RAILWAY SYSTEM



A YEAR and a half ago we made a promise to you in the advertisement reproduced above.

Since making that promise, we have bought 244 more new Diesel locomotive units at a cost of over \$39 million. We have purchased 2,550 new freight cars costing about \$14 million. We are spending approximately \$16 million for new yards and yard modernization.

These are only a few of the things we have

done in the past 18 months to live up to our promise. Many other things have been done and will be done. Because our promise "to keep pace with the increasing transportation needs of the South"—and to meet the needs of national defense—is a pledge that we are determined to keep.

Ernest E. Harris
President

SOUTHERN RAILWAY SYSTEM



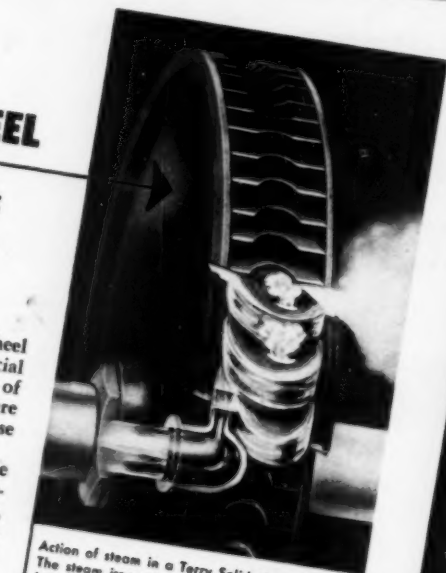
TERRY

THIS TURBINE WHEEL

*has no parts
to loosen or
work out*

The rotor of the Terry Solid-wheel Turbine is a single forging of special composition steel, in which a series of semi-circular buckets is milled. There are no separate parts to become loose or work out.

The power-producing action of the steam takes place on the curved surfaces at the back of the buckets. Hence, wear of the blades is of little consequence, as it does not materially affect



Action of steam in a Terry Solid-wheel Turbine. The steam issues from an expanding nozzle at high velocity and enters the side of the wheel bucket where its direction is reversed 180°. As this single reversal uses but a portion of the available energy, the steam is caught in a stationary reversing chamber and returned again to the wheel. This process is repeated several times until practically all of the useful energy has been utilized.

horsepower or efficiency. There is practically no end thrust since the steam enters and leaves the wheel in a direction at right angles to shaft.

This is only a small part of the story of the many advantages of the Terry Solid-wheel Turbine. Write for complete details.

THE TERRY STEAM TURBINE CO.
TERRY SQUARE, HARTFORD 1, CONN.

TT-1189

Memo

Send for a copy of
bulletin S-116
which describes
the many advantages
of the Terry Solid-
wheel Turbine.

DIAMOND SOOT BLOWERS

Meet the challenge of

The greater emphasis being placed on high boiler availability indicates the equal importance of high soot blower availability. The first can be limited by the second.

No other power plant equipment takes the "beating" to which soot blowers are daily subjected. Elements are exposed to repeated, sudden and severe thermal shock . . . to extremes of temperature, erosion and corrosion.

Diamond has long paid particular attention to "high availability" in its research . . . in the design, in the selection of materials and in the manufacture of all Diamond Soot Blowers. That they excel in this direction

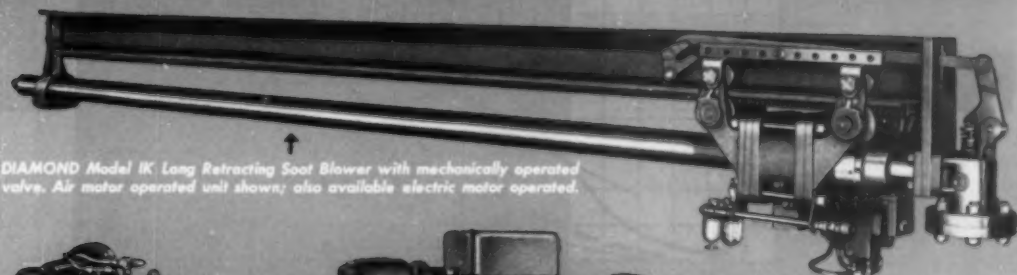
HIGH BOILER AVAILABILITY

also is attested by their performance records . . . and by the preference they have long enjoyed among the most critical users of boiler equipment. The next time you need soot blowers, it will pay you well to select Diamond Soot Blowers.

DIAMOND POWER SPECIALTY CORP.

LANCASTER, OHIO

Diamond Specialty Limited • Windsor, Ontario



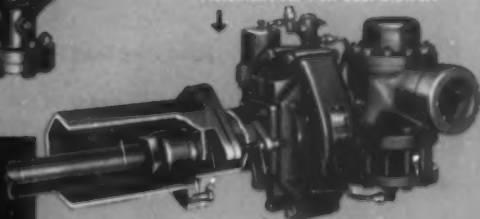
DIAMOND Model IK Long Retracting Soot Blower with mechanically operated valve. Air motor operated unit shown; also available electric motor operated.



DIAMOND Model G9B Soot Blower. Air operation shown; also available for manual or electric operation.

DIAMOND Model IR Short Retracting Soot Blower. Electric operation shown; also available for manual or air operation.

DIAMOND Model A2E Automatic Air Puff Soot Blower.

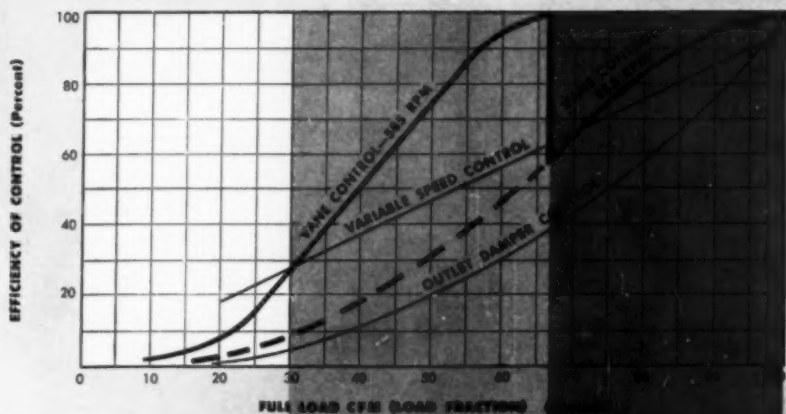
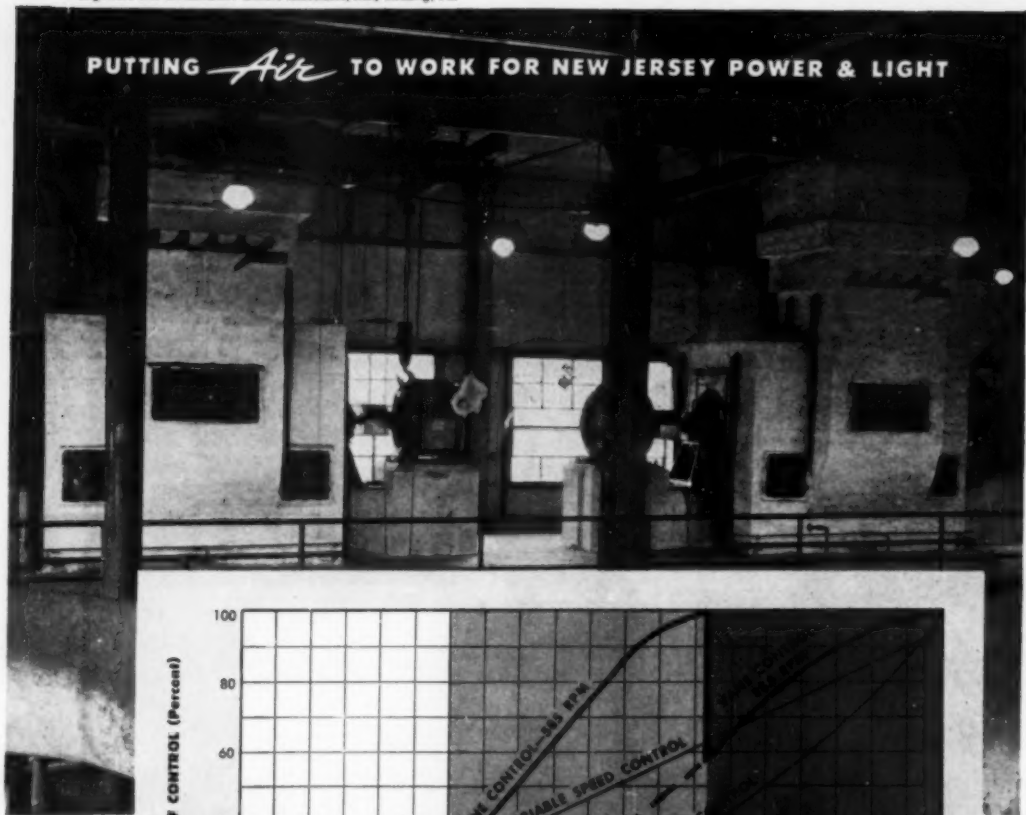


**There is a DIAMOND Soot Blower . . .
for Every Boiler Cleaning Requirement**

For ECONOMY

Engineers and Consultants: Gilbert Associates, Inc., Reading, Pa.

PUTTING *Air* TO WORK FOR NEW JERSEY POWER & LIGHT



If you operate in this range—and New Jersey Power & Light does—
VANE CONTROL is the economical choice.

$$\text{Ideal Part Load Fan Power} = (\text{Full Load Fan Power}) \times (\text{Load Fraction})^3$$

$$\text{Efficiency of Control} = \frac{\text{Ideal Part Load Fan Power}}{\text{Actual Load Input}}$$

Plus FLEXIBILITY...

STURTEVANT

VANE CONTROL®

WITH TWO-SPEED MOTORS

When New Jersey Power & Light selected Sturtevant Induced Draft Fans for the new No. 3 boiler in their Gilbert Station at Milford, they wanted greater flexibility *plus* economy over a wide range of operation. They achieve this by using the two TURBOVANE® ID Fans shown at left, each drawing 192,000 cfm at 16.9" static pressure and 315°F. Each fan is equipped with power-saving VANE CONTROL and driven by two motors—one at 880 rpm and one at 585 rpm. As plotted on the accompanying chart, this arrangement provides the maximum economy of operation over their entire load range, with greater flexibility.

This installation illustrates once again the dependable, economical performance which central stations and industrial power plants have come to recognize as the outstanding features of Sturtevant Mechanical Draft equipment. These features explain the many *repeat* orders for Sturtevant Forced and Induced Draft Fans from satisfied customers.

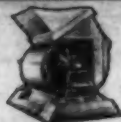
If you are interested in *putting air to work* efficiently, contact your nearest Westinghouse-Sturtevant Office, or write to Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

YOU CAN BE SURE...IF IT'S

Westinghouse

PUTTING *Air* TO WORK

J-80236A



FORCED DRAFT FANS



INDUSTRIAL FANS



CENTRIFUGAL COMPRESSORS



AXIAL FLOW FANS



INDUCED DRAFT FANS

Wagner
ELECTRIC MOTORS
...the choice of leaders
in industry

*wherever
motor
hazards
prevail...*

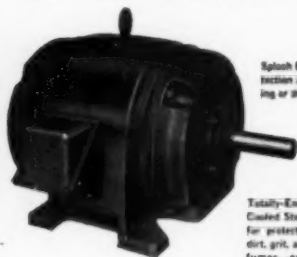


M51-10

GUARD PRODUCTION WITH **Wagner** Protected Motors

Do you use motors in locations where dirt, filings, moisture, splashing liquids, explosive gases, acid fumes, or other motor hazards prevail? If you do —no matter how severe the operating condition—Wagner can furnish the *right* motor for your purpose, adequately protected for specialized requirements.

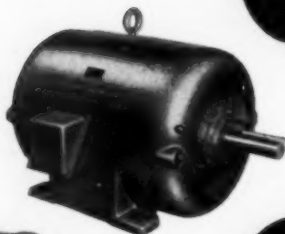
Wagner protected type motors are known for completely dependable operation in their specific applications. They are backed by sixty years of motor building experience. Five protected-type Wagner Motors are shown below. Bulletin MU-185 gives full information...write for your copy.



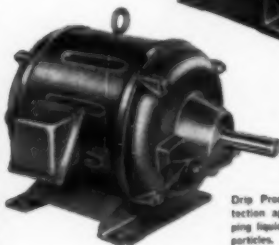
Splash Proof—for protection against splashing or dripping liquids.



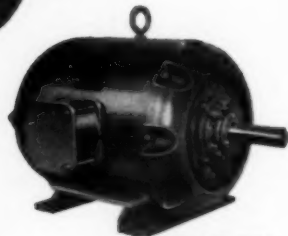
Totally-Enclosed Fan-Cooled Steel Frame—for protection against dirt, grit, abrasives, or fumes—even in abnormal quantities.



Totally-Enclosed Fan-Cooled Cast Iron Frame—for protection against corrosion from fumes or moisture.



Drip Proof—for protection against dripping liquids or falling particles.



Explosion Proof—for complete protection in hazardous atmospheres.

WAGNER ELECTRIC CORPORATION
6383 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

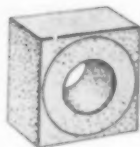
*We're finding new uses every day for versatile **KAOCAST***



Even our Field Engineers are surprised to discover the amazing variety of uses for versatile KAOCAST. This unique 3000 degree refractory castable has been put to work in scores of imaginative applications where it has paid off in lower installation costs, faster repairs, longer service life. Here are a few examples:

- KAOCAST replaced firebrick in door linings... lasted 3 to 6 times as long, cut costs in half.
- In a tunnel kiln, ordinary castables used for covering car tops crumbled after a few trips. KAOCAST stayed on the job for 30 trips without deterioration.
- Versatile KAOCAST proved "better than anything previously used" for piers of a stoker-fired boiler.
- This jack-of-all-refractories performs so well that one central station keeps a large stock on hand for miscellaneous jobs.

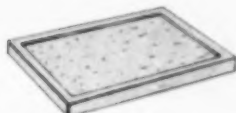
Are you missing a money-saving opportunity to use versatile KAOCAST? Ask your B&W Field Engineer to give you additional facts and figures... to help you profit with KAOCAST. • KAOCAST is another important refractories development by B&W engineers who have continuously established new standards in industrial furnace refractories for the past 30 years.



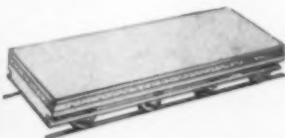
KAOCAST Burner Blocks



KAOCAST Covering for Water Cooled Furnace Tubes



KAOCAST Door Lining



KAOCAST Car Top



KAOCAST Boiler Baffles

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICE: 85 LIBERTY ST., NEW YORK & N.Y.
WORKS: ALBANY, N.Y.

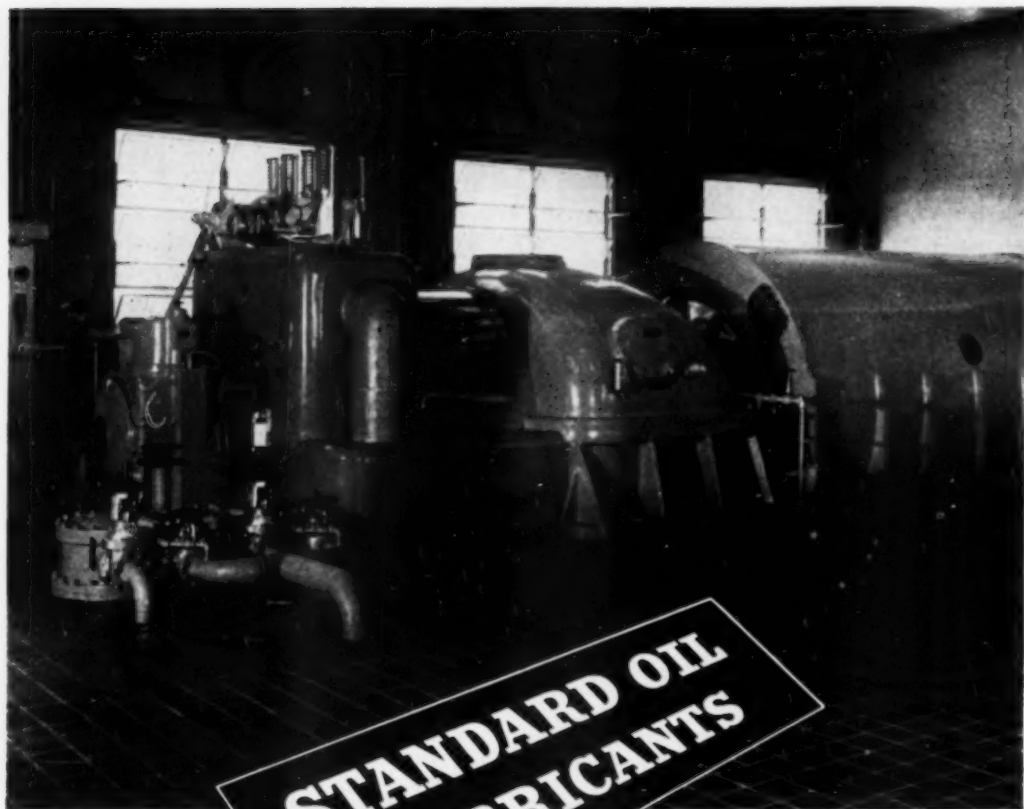
R-401

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick
B&W Refractory Castables, Plastics and Mortars • **OTHER B&W PRODUCTS**—Stationary & Marine Boilers and Component Equipment...
Chemical Recovery Units... Seamless & Welded Tubes... Pulverizers... Fuel Burning Equipment... Pressure Vessels... Alloy Castings

The best turbine oils are those that free themselves of air and water, resist oxidation and rust, and eliminate sludge and gum tendencies. Standard Oil turbine oils have been famous for these *very* qualities for many years. They have shown little or *no* trace of oxidation after years of service in industrial, public utility and marine installations, often far

minus air and water

surpassing the performance record of the oils which they replaced. They are refined by the most modern methods, from carefully selected crudes, assuring the highest possible resistance to oxidation, rusting and foaming. For dependable turbine lubrication, consult one of our representatives. Remember—the combined facilities for research, testing and engineering behind the line of industrial lubricants he offers, are *unequaled*.



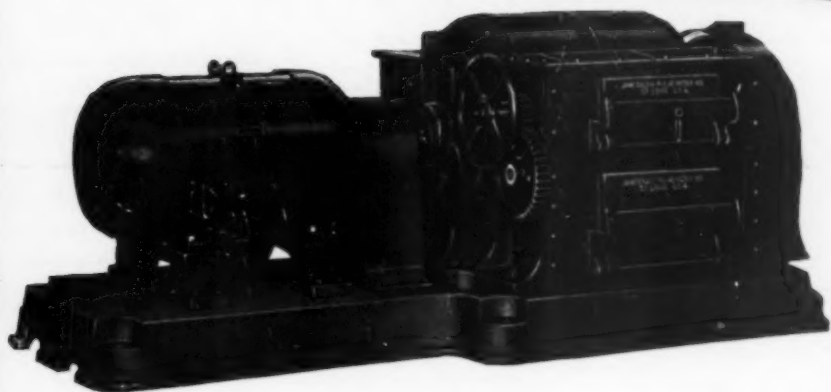
STANDARD

OIL COMPANY (KENTUCKY)



"CRUSHING" FACTS on *American Crusher* PERFORMANCE

(Taken From An Independent Survey)



AC-7-C REDUCES 12" ROM COAL TO MINUS 1"—AT 550 TPH

"Operating at 10% Beyond Rated Capacity . . .
10% Under Power Capacity"

Here's the whole production story on this American AC-7-C, installed in a South Carolina Power Plant . . . reducing 12" ROM lumps to —1" at 50 tons per hour in excess of the factory-rated capacity—and doing it on only 90% of the potential motor load!

Once again, the efficient American-originated Shredder Ring Crusher has proved its ability to produce more on lower power needs.

Why not let us tell you the full story? Write for literature today.

American

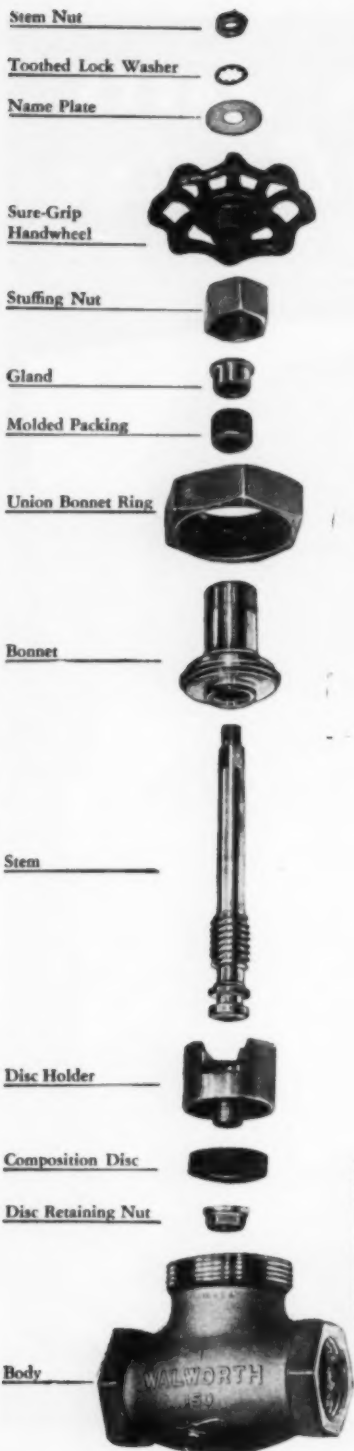
PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers



1243 MACKLIND AVE.

ST. LOUIS 10, MO.



WALWORTH No. 95

...150 pound bronze globe valve
with renewable
composition disc.



Walworth has redesigned
and improved its No. 95
Quality Bronze Globe Valve.

150 pounds working steam pressure at 500F
300 pounds cold water, oil, or gas.

Can be repacked under pressure when fully opened.

The Walworth No. 95 Bronze Globe Valve has always been tops with piping men because they liked these features: Renewable composition disc; lock-on, slip-off disc holder; union bonnet construction; deep stuffing box; tough bronze body made of Composition M (ASTM B61).

Now Walworth has added these improvements: (1) New cylindrical disc holder that accurately guides the disc to the seat, regardless of the position in which you install the valve. (2) Newly designed, air-cooled, sure-grip handwheel that you can grab and turn, even when wearing greasy work gloves. It has a tapered square hole sized to gage to fit snugly on the finished square of the stem. (3) Toothed lock-washer to prevent the stem nut from becoming loose. (4) All parts have been redesigned to give maximum service and strength.

Walworth Quality Bronze Valves are available in Globe (No. 95), Angle (No. 96), or Check (No. 97) types and in sizes from 1/4 to 3 inches (check valves 1/4 to 2 inches). Ask your Walworth distributor to show you the improved Walworth No. 95 Bronze Valve, or write for further details.

WALWORTH
valves and fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

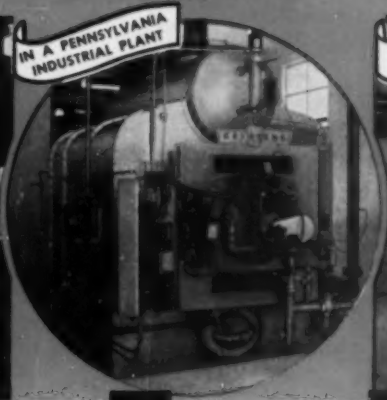
**DISTRIBUTORS IN PRINCIPAL
CENTERS THROUGHOUT THE WORLD**

IMMEDIATE STEAM

Introducing the Newest Idea
IN STEAM GENERATION!



IN A CUBAN
SUGAR MILL



IN A PENNSYLVANIA
INDUSTRIAL PLANT



IN A NEW YORK
DAIRY

Developed Boiler Horse Power	75	100	150	200	250	300	350	400	450	500	600	700	800
Heating Surface Sq. Ft.	357	500	730	1000	1250	1500	1750	2000	2250	2500	3000	3500	4000
*Capacity Lb./Hr.	2490	3320	4980	6640	8290	9950	11,610	13,290	14,940	16,620	19,930	23,220	26,550
Overall Length — A	14'-10"	14'-10"	19'-6"	19'-6"	20'-0"	22'-0"	22'-0"	23'-0"	24'-8"	25'-0"	25'-6"	25'-6"	26'-4"
" Width — B	6'-3"	6'-6"	7'-1"	7'-8"	7'-8"	7'-8"	8'-9"	8'-9"	8'-9"	9'-0"	9'-8"	10'-3"	10'-3"
" Height — C	9'-3"	9'-9½"	9'-9½"	10'-3¼"	10'-3¼"	10'-3¼"	11'-3¼"	11'-3¼"	11'-3¼"	11'-3¼"	12'-7¼"	12'-7¼"	12'-11½"
Upper Drum Dia.	34"	34"	34"	34"	34"	34"	34"	34"	34"	34"	38"	38"	38"
Lower Drum Dia.	24"	24"	24"	24"	24"	24"	24"	24"	24"	24"	28"	28"	28"
Dia. Gas Outlet	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"
Shipping Weight Lbs.	20,000	22,000	25,000	27,000	28,000	30,000	33,000	36,000	44,000	52,000	60,000	65,000	70,000

*Based on Feed Water at 212°F and Steam at 100# psi.

Conservative ratings based on 5 sq. ft. per developed hp.

It's a 2-drum water tube boiler with integral water cooled furnace. Gases travel 3 lengths of the boiler—scrubbing 5 bare metal heat absorbing zones. It's complete—needs only service connections—burns oil or gas or both—requires no stack—no special foundation.

Write for booklet SB38D.

COMPLETE STEAM POWER PLANT EQUIPMENT

**ERIE
CITY**

Complete Steam Generators • Type C 3-Drum Boilers • Types VL & VC 2-Drum Boilers
• "Economic" Boiler with or without Water Walls • Welded H. R. T. Boilers • Welded
Steel Heating Boilers • "KeyStone" Packaged Steam Generators • Coal Pulverisers
• Underfeed and Spreader Stokers • Welded Pressure Vessels for the Process Industries.

ERIE CITY IRON WORKS • ERIE, PA. • Since 1840

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



STEEL — SOUTHERN OUTPUT CLIMBS

Baseplate of industry is Steel—and in ten years Southern production has climbed 60%. Mills pour more ingots, roll more billets, use more power.

Westinghouse helps them use this power better. Take for example the high-speed rolling mill shown above in a big Southern plant. A continuous steel strip races through the rolls, whips out of the last roll-stand at 35 mph. In each stand, thickness is reduced and the strip gets longer. So each stand must run faster than the last one. To avoid stretching the strip, speed relationships must be held with hairline accuracy—a tricky problem.

Westinghouse solved it with Rototrol®, the almost-human electrical intelligence. Rototrol automatically measures and regulates the voltage supplied the giant Westinghouse motors driving the rolls, keeps their speed ratios precisely synchronized. This kind of thinking (and it can be applied to *your* problems) helps Southern industry produce faster—and more.

WHY IS SOUTHERN POWER OUTPUT UP $2\frac{3}{4}$ Times?

Take a look at these bright figures. In 1940, the generators in Southern power plants spun out 34 billion kilowatthours. The figure just ten years later: 91 billion *kwhrs.* That's a boost of 170%, a growth rate 34% over the U. S. average!

What's behind the big jump? The major factor: industrial growth. In the last ten years, the total sales-dollar return of Southern industry has rocketed $3\frac{1}{2}$ times higher. And with industry using over $\frac{3}{4}$ of Southern power, you can see where the new KW's are going!

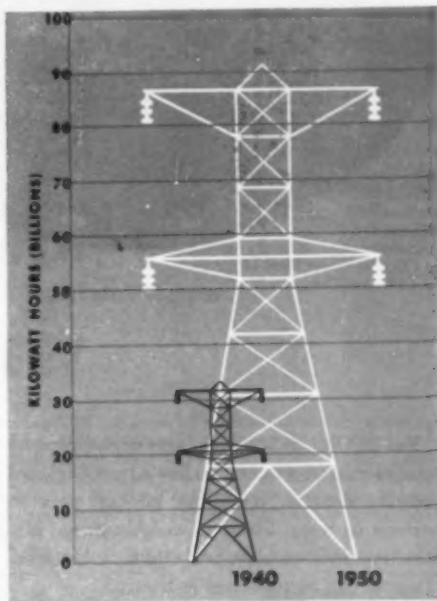
Many individuals and many organizations are responsible for this outstanding record. Westinghouse is proud to be among them. A big percentage of Southern power is generated in equipment engineered by Westinghouse. And simultaneously, first-rate Westinghouse equipment helps Southern industry *use* this power to best advantage—and thus expands power consumption and industrial output.

Much of this apparatus is produced by the 8,000 Westinghouse employees in our thirteen Southern plants—for early in the company's history, Westinghouse saw the advantages of manufacturing in the South.

Westinghouse has been in the South for a long time as a supplier, producer, and customer. We know the needs and problems because they're

ours as well. Your Westinghouse office is a good place to go for help in expanding power capacity and getting the most out of it.

J-92018



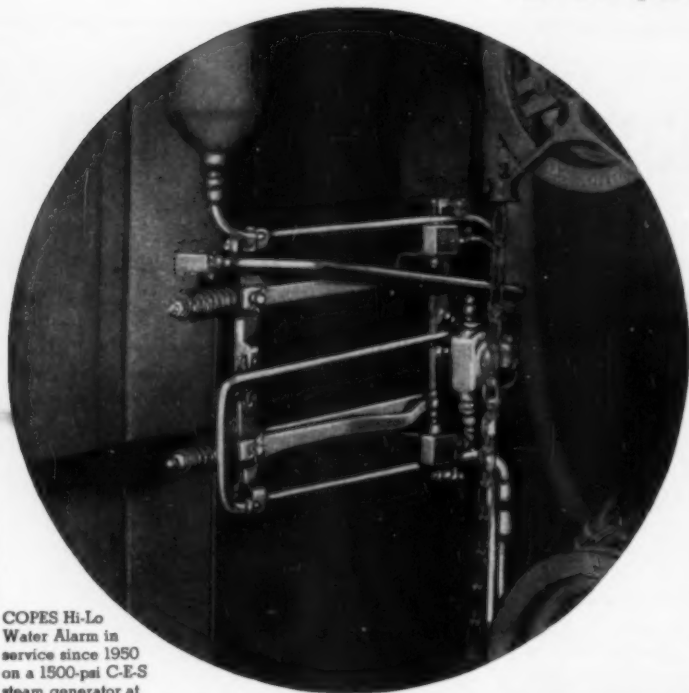
Westinghouse

A BASIC PART
OF THE SOUTH



COPES Hi-Lo WATER ALARM

as simple and dependable
as the COPES
expansion tube



COPES Hi-Lo Water Alarm in service since 1950 on a 1500-psi C-E-S steam generator at Trenton Channel Power Plant of The Detroit Edison Company.

HERE'S a new Hi-Lo Water Alarm, based on exactly the same established principle that has made the COPES Feed Water Regulator so successful for the last fifty years. On both stationary and marine boilers, it gives trouble free dependability at all working steam pressures. Simple, fool-proof and maintenance-free. Compact and self-contained. Easily installed without special supports or complicated piping—with or without a water column. Bulletin 493 tells the full story. Write for it.

NORTHERN EQUIPMENT DIVISION

CONTINENTAL FOUNDRY & MACHINE COMPANY
1213 GROVE DRIVE • ERIE, PENNSYLVANIA

The COPES Hi-Lo Alarm uses no bellows, no diaphragms, no weights, no floats, no differential pressure devices. It has no internal parts to corrode or wear. Standard audible signal is a horn; standard visible signal, lights. Other types of signal can be furnished as desired.



ENGINEERED BY THE MAKERS OF



FEED WATER REGULATORS

Yours for the asking—

ON THIS SIDE - Data on the WeldELL line

ON THIS SIDE

- Data on Taylor Forged Steel Flanges

A VOLUME OF DATA

... covering welding fittings and forged steel flanges ...

ON A SINGLE SHEET

Here is just about the handiest tool ever devised for the pipe designer. Data on welding fittings and flanges that otherwise could be found only by plowing through many catalog pages and tables have been ingeniously condensed on the two sides of the durable letter-size card illustrated above.

One side covers the broad WeldELL line of Taylor Forge welding fittings. For every nominal pipe size, $\frac{1}{2}$ " through 30", it shows the wall thickness for every weight of every fitting in every available material. It also shows all required dimensions of all types of fittings.

The other side covers the world's most complete line of forged steel flanges. For every nominal pipe size, $\frac{1}{2}$ "

through 24", it gives all essential dimensional and bolting data for all types of flanges in all weights. A particularly useful table (see reproduction) is that showing welding neck flange bores which enables you to determine the I.D. of any nominal pipe size without separate calculation. Thus the sheet gives you O.D. and I.D. of any weight of pipe.

The card is varnished to make it stand the steady usage you are certain to give it. To obtain your copy see your Taylor Forge distributor or

MAIL THE COUPON.



TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS

General Offices and Works: P. O. Box 485, Chicago 90, Ill.

Offices in all principal cities.

Plants at: Carnegie, Pa.; Fontana, Calif.; Hamilton, Ont., Canada

Please send me one of your fitting and flange sheets:

NAME _____

POSITION _____

COMPANY _____

STREET ADDRESS _____

CITY _____ ZONE _____ STATE _____

758-0951 Mail to Taylor Forge & Pipe Works, P. O. Box 485, Chicago 90, Ill.

FOR

Greater

DISCHARGE
CAPACITY...



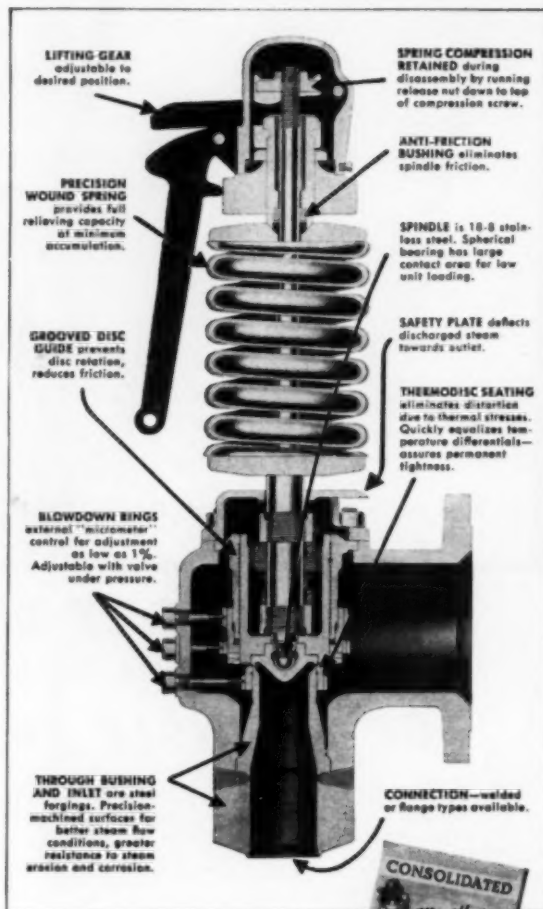
CONSOLIDATED
Maxiflow
SAFETY VALVE

High-pressure, high-temperature steam generating equipment demands safety valves with greater discharge capacity. Consolidated Safety Valves first saw service in 1879. Today, every feature modern engineering can contribute is incorporated in Consolidated Maxiflow Safety Valves to provide the greater discharge capacity so essential in steam generating plant operations.

EXAMPLE: 2½" MAXIFLOW

Gauge Pressure P.S.I.	Capacity Saturated Steam Pounds Per Hour A.S.M.E. Rating
1200	143,700
1500	179,000
2000	238,400
2500	297,600

Whatever size safety valve you need in your plant—1½", 2", 2½", 3" or 4"—you can rely on Consolidated Maxiflow to discharge maximum flow, with shorter blowdown. Popping point retention is achieved by combining proper compensation with materials having low coefficients of expansion. These and many other performance features set a new standard in safety and service.



For complete data, including capacity tables, write for Bulletin 707.



CONSOLIDATED SAFETY VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT
MAKERS OF 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'MANCOCK' VALVES, 'ASHCROFT' GAUGES, BUILDERS OF 'SHAW-BOX' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

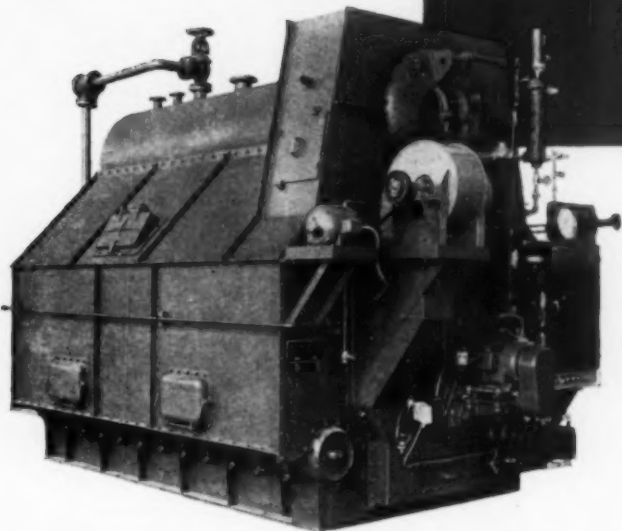
-in action quicker!



WICKES

shop assembled power

**FOR YOUR STEAM
GENERATING NEEDS**



Steam power in a compact, efficient shop-assembled unit, custom-engineered to your exact steam generating requirements, ready for immediate installation! Wickes Type A Steam Generator is a steel-encased unit complete with baffles, refractories, pressure parts and firing equipment, designed to conserve head-room and floor space. Each furnace wall is a separate steam generator as well as an integral part of the boiler. There are no complicated headers or circulating tubes to require frequent maintenance or repair. Wickes Type A shop-assembled boilers are engineered for pressures up to 900 psi. with sustained steam production up to 35,000 lbs. per hour at 20 to 330 nominal h.p.

Wickes can also fill your requirements for steam generators up to 250,000 lbs. per hour and 950 psi. — all types of multiple drum boilers adaptable to any standard method of firing, oil, gas, single retort underfeed or spreader stoker. Write today for descriptive literature on Wickes complete line of steam generating equipment or consult your nearest Wickes representative.

WICKES

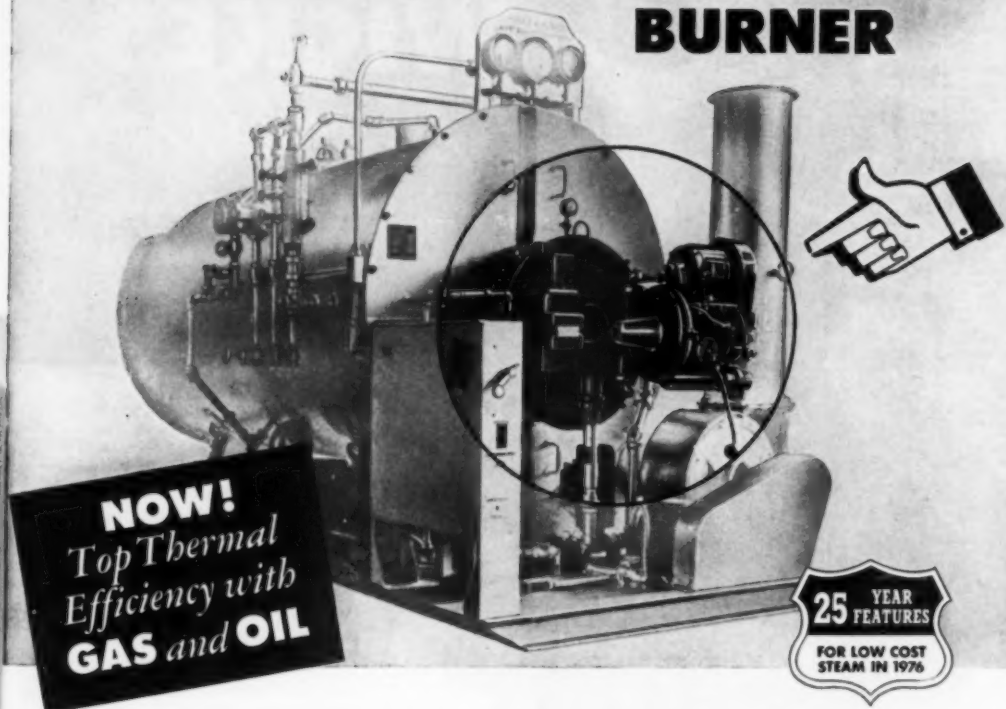
THE WICKES BOILER COMPANY
DIVISION OF THE WICKES CORPORATION
SAGINAW, MICHIGAN

RECOGNIZED QUALITY SINCE 1854 • SALES OFFICES: • Atlanta • Boston • Chicago • Cincinnati • Denver • Detroit • Houston • Indianapolis • Los Angeles • Milwaukee • New York City • Pittsburgh • Saginaw • San Francisco • San Jose • Springfield • Seattle • St. Louis • Tulsa • Mexico City • Buenos Aires • Manila • Havana • Montevideo • San Juan, P. R. • Victoria, B. C.

SOUTHERN POWER & INDUSTRY for DECEMBER, 1951

NEW!

PREFERRED COMBINATION BURNER



Here's a new fuel-saving development worth noting! Preferred brings you a new principle in combination oil and gas burners. For the first time, *two burners* are used . . . each one specially designed to deliver the highest thermal efficiency for each fuel. Both the well-known Preferred Horizontal Rotary Oil Burner and Preferred's new dual, pre-mix type gas burner are built into each Preferred Combination Unit Steam Generator.

You get at least 80% guaranteed thermal efficiency for the life of the unit . . . no matter which fuel is used. There's no compromise . . . no sacrifice of efficiency that often results when one burner is used for both fuels. Changeover from oil to gas, or vice versa, takes less than 20 minutes.

For overall economy, read about Preferred's distinctive 25-year features in the panel at right. Full details in Bulletin 1000. Write for your copy today.

Each distinctive feature of the Preferred Unit Steam Generator is designed to give efficient, economical service for an average of 25 years with proper care and maintenance. You benefit by better performance . . . longer life . . . lower boiler costs.

1. Anti-stress deck for tube sheet protection.
2. Special precipitator developed by Preferred as aid to safe, clean operation.
3. Staggered tube construction - minimizes possibility of tube pitting, even at low firing rates.
4. 4600 rpm horizontal rotary oil burner with patented VOLUVALVE fuel regulation - designed and manufactured by Preferred - assures fully automatic operation even with No. 6 oil.
5. Self-cleaning induced draft fan with air cooled shaft and bearings - assures long life.
6. Down-draft gas travel, with Airlock design, for 80% thermal efficiency - proved and guaranteed.
7. Dual purging cycles for positive elimination of gas stratification.
8. 4-pass, high velocity, gas travel - minimizes tube cleaning maintenance by self-cleaning action.

PREFERRED UTILITIES MANUFACTURING CORP.

1860 BROADWAY, NEW YORK 23, N. Y.



PR-500

POWELL is more than a name

It's the hallmark of better quality in valves. That means better performance, longer life and lower cost of maintenance.

Also because Powell makes the valve to suit the service, you have at least two reasons why there are more types of Powell Valves serving industry today than any other make.

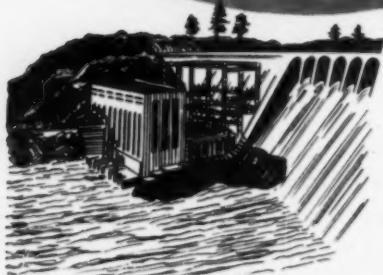
The Wm. Powell Co., Cincinnati 22, Ohio

Fig. 11303 W. E.
Series 1500-pound, Cast
Steel, Pressure Seal Gate
Valve with welding ends.
One of many Powell
designs for Power Plants.

POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES



MORE POWER FOR GEORGIA



The Georgia Power Company operates 8 steam-electric generating plants, 22 hydro-electric plants, and 1 oil engine plant, with a combined capacity of almost one million Kw.

HORTON PENSTOCK installed at Bartlett's Ferry for Georgia Power Company

The Georgia Power Company recently increased the generating capacity of its Bartlett's Ferry hydroelectric plant to 65,000 kilowatts. This marks the third expansion in twenty-five years at the Chattahoochee River dam site and reflects the constant and growing demands for electric power in the South.

The Horton welded steel penstock shown below plays an important part in the expansion program at Bartlett's Ferry by supplying water to a newly installed turbine.

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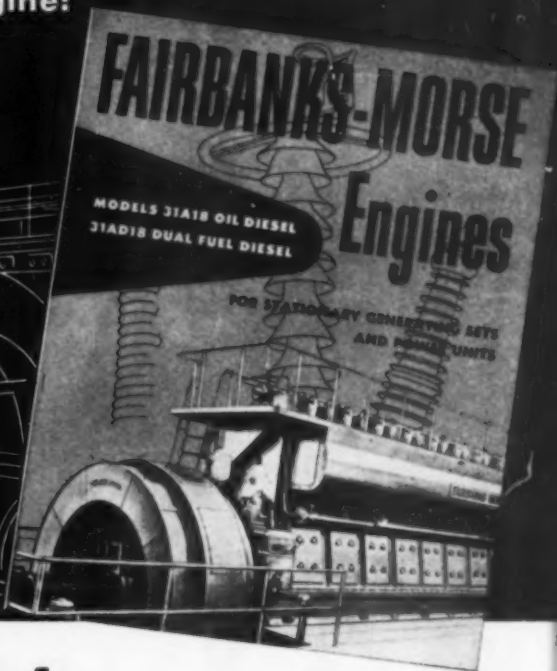
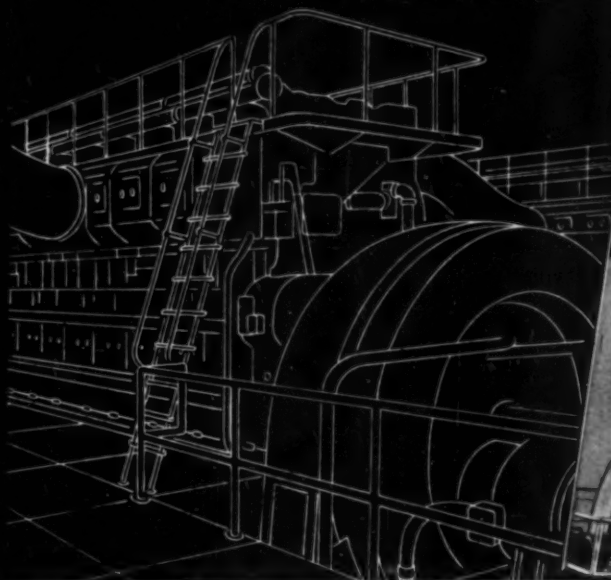
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Describes Newest **BIG** Fairbanks-Morse
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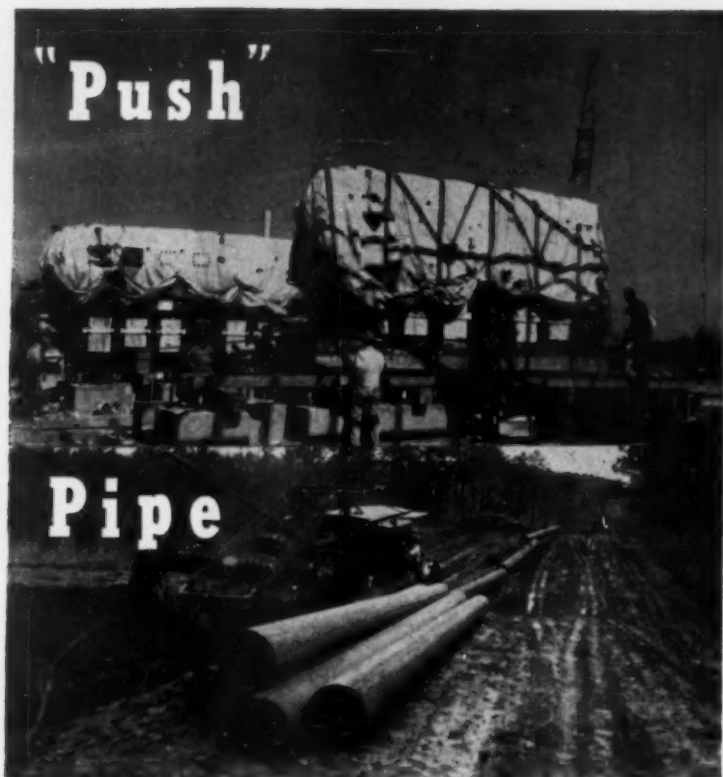
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Timely Comments

Reading Habits

PERHAPS IF the editors were out to win a popularity contest among readers, their best bet would be to print only well known information.

Then the reader could pat himself on the back and say, "Yes! Yes! That's right; that's exactly the way I do it." But such information would not do the reader much good. The editor of a good technical magazine must keep at least one jump ahead of his field. He must continually endeavor to lead his readers into new fields—tempt them with new ideas—bait them into studying practices that are not yet quite proven, but look promising.

The engineer who says today that he is not interested in electronics, cathodic protection, nuclear physics, and supersonics, must not expect to live very long. These and other new sciences will be tomorrow's work tools, and the time to learn about them is before they become entirely commonplace.

No working engineer can read everything he should, but he can allocate a portion of his time to studying for the future. We admit that perhaps 80 per cent of his reading should be on current practices in his own field; that is needed to keep up. But the other 20 per cent should be given to advanced study of subjects that are not yet his direct concern; that is needed to keep ahead.

Editors of technical publications are in a particularly favorable position to guess what is coming, and help their readers keep ahead in their thinking. Mail across the editor's desk comes from many important sources, and from it he can tell how the great minds of industry are working. Whenever it can be noted that a great many smart scientists, engineers, and manufacturers are struggling toward a certain goal, it is fairly safe to guess that the goal will be reached. American industry does not long work an unproductive field; scientific efforts are directed largely toward possible goals—and continued collective effort finally gets results.

Live Subjects

Right now there are many, many "hot subjects." Some projects are nearly perfected, some are just beginning, and some are still in the dreamy stage.

Electronics is well established, television is just breaking into industry, and atomic power seems a long way off. Plant engineers will need to know about all of these things—and perhaps sooner than they think. Aside from electronics, perhaps the fastest moving studies and experiments today are on new engineering materials—mostly chemical or synthetic in nature.

Cements—Science is right now way ahead of the engineer on cements. Effective, practical adhesives can be bought today that the field has barely begun to recognize.

Alloys—The old definition of 2 or more metals doesn't mean much any more. Other things aside from metals (notably ceramics) are going into the pot; and how it is mixed becomes as important as what is mixed. Not only better alloys, but substitute alloys (saving scarce materials) are receiving attention. A letter today invites us to see a "recently developed process of applying electrolytic iron—saving thousands of tons of copper, nickel, etc., by restoring expensive machined surfaces to new condition."

Cathodic Protection—Many students believe that corrosion can be eliminated, once we learn how to apply known principles of cathodic protection. Even boiler corrosion may ultimately be controlled by such measures.

Protective Coatings—New paints, varnishes, and synthetic skins are demanding attention. Certainly the old sand blast and daub procedures are in for a re-examination. Any big plant that is not now trying new coatings is failing to contribute much needed field experience to confirm or refute laboratory indications.

Detergents—Soap and water cleaning methods are doomed. No suds, no scrubbing. Industrial cleaning is a new science, but many needed answers are available and proven.

Heat Pumps—Reverse cycle refrigeration is about as near as the engineer has ever come toward getting something for nothing. True, it is not yet entirely whipped, but many installations are working satisfactorily—and the scientists are still busy.

Man-Hours—No one is seriously trying to develop an automaton, but anything that will save man-hours is receiving serious study. Human effort today is too valuable to be wasted on action that can be made mechanical and automatic. Materials handling equipment, automatic cycling, mechanical sorting, remote recording and control, are only a few of the many man saving devices coming into everyday use.

Keep Reading

No engineer can hope to know all the details of all the remarkable new developments that are taking place, but he can know that these things are happening. He can know that his own methods are subject to improvement. And he can know where to start looking for needed information. He does not have time to read all he should, but he must read all he can.



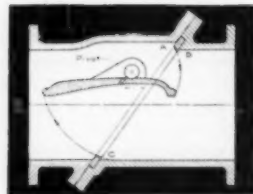
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Here's the check valve with the balanced disc which is cushioned to a quick and quiet closure by the flow of gases or fluids as you can see in the cross-section at the right.

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Cross-section of the Chapman Tilting-Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

Industry Speaks

Big and Small Business Closely Allied

Adapted from comments by Arthur V. Wiebel, president of the Tennessee Coal, Iron and Railroad Company of Birmingham, at the Memphis, Tennessee Eighth Annual Conference of the Purchasing Agents of the Southeast.

NEITHER the so-called "big business" of America nor the nation's smaller industrial and commercial concerns could operate successfully without the strong economic ties existing between the two groups. TCI, one of the largest manufacturing concerns in the South, leans heavily on small businesses both as a source of supply for its raw materials and equipment and as the major market for its steel products.

"TCI, in its own interest, as well as because of its broader interest in the prosperity of the South and of the nation, has long followed the established policy of dealing as fairly and generously with small enterprise as with its larger competitors.

"Not only do we buy millions of dollars worth of goods and services each year from the smaller operators, but we have in many instances actually helped such concerns to become firmly established, through the assurance of our business."

Interdependence between large and small business works in two directions—purchasing and marketing. Although TCI is of necessity a large concern, most of its customers are relatively small companies which can buy only a little steel at a time. Of 4100 customers in 1950, only 578 purchased on average more than a car-load of steel a month; those buying lesser amounts of steel products accounted for 86 per cent of the company's sales.

A fact that is highly pleasing to him, Mr. Wiebel stated, is that the South is rapidly becoming industrially self sufficient.

"Last year we made purchases from more than 4600 vendors of which 2100 were located in the South and Southwest. We were able to procure just about 10 to 12 per cent of our material requirements in the South only a few years ago, but we now place 56 per cent of our business with Southern firms."

Watch Synthetic Textiles in the South

Adapted from comments by Dr. Frank J. Soday, director of research, Chemstrand Corporation, at the Southwide Chemical Conference, jointly sponsored by the American Chemical Society and the Southern Association of Science and Industry.

EXPANSION of the Southern chemical industry will be spearheaded by a four-fold growth of the synthetic textile industry in the next ten years. Approximately 145 million pounds of synthetic fibers were produced in this country in 1950. Production is expected to increase to 400 million pounds in 1953, to 500 in 1958, and to 750 million pounds in 1960.

The South will gain most of this new industry because of the availability of good plant sites, an adequate supply of labor, an abundance of water, excellent transportation facilities, raw materials, fuel and power, and ready access to large and important consumer areas.

Expansion in synthetic fiber production will be as striking as the region's recent progress in cotton textile

activity. At the turn of the century more than 70 per cent of the cotton spindles of the nation were located in the New England states, whereas today 75 per cent are located in the South.

Dr. Soday notes that the relatively new synthetic fiber industry is the offspring of the chemical and textile industries and as such "it was inevitable that it would be located in the South." The South's new chemical plants provide the required raw materials for synthetic fibers while the South's textile mills convert these fibers into fabrics for the consumer markets.

Chemstrand (established by the Monsanto Chemical Company and the American Viscose Corporation to manufacture synthetic fibers) is building a plant at Decatur, Alabama, for the production of 30 million pounds per year of the new staple fiber "Acrilan," and a second plant at Pensacola, Florida, for the production of 50 million pounds per year of "Nylon." These plants represent an investment in excess of \$100 million.

Waste Problems Being Solved by Industry

Adapted from comments of a panel of experts on disposal and utilization of industrial wastes at the Southwide Chemical Conference at Wilson Dam, Alabama.

DESPITE rapid industrialization in the South, both some industrial odors and stream pollution are being reduced and may soon be a thing of the past.

Dr. Harold R. Murdock, of Robert & Company Associates, Atlanta, said that on the basis of present knowledge it is possible to design and build manufacturing plants in which wastes could be handled by safe and practical means. He noted that when du Pont planned to build a large new chemical plant adjacent to a Texas river, the Company had the Academy of Natural Sciences conduct a careful study of plant and marine life along the river bank and even into the mud of the river bottom to determine their health. Then, by comparisons made when the plant was placed in operation, the company was able to maintain a similar state of plant and marine life. There was no injurious effect resulting from the industrial operation.

Dr. Robert R. McNary of the Florida Citrus Commission, Lake Alfred, Florida, reported on developments in the processing of wastes from citrus juice concentrate plants. The magnitude of this industry is indicated by the fact that the total Florida orange, grapefruit, and tangerine crop last year amounted to about 5 million tons. It was estimated that peel, seeds, and other waste or by-products material amounted to 1.8 million tons.

Converting this waste into useful materials has become a substantial industry. Large quantities of citrus pulp are dried and sold for cattle feed and for alcohol production. Some wastes cannot yet be used, however, and processes have had to be developed for disposing of them.

Problems of waste disposal in the cotton textile industry were discussed by Dr. Edward Abrams, head of the textile section of the Southern Research Institute in Birmingham. He said that bleaching and dyeing operations posed difficult problems but that various means of neutralizing wastes are being devised.

Miami Paperboard Mills

Report on Power Modernization

MIAMI Paperboard Mills, Inc., at Miami is the only mill in Florida producing folding and set-up paper boards and box boards. Other Florida mills produce primarily kraft grades. Production capacity is approximately 60 to 75 tons per day, varying with the grade manufactured. The president and controlling stockholder is Mr. S. Simkins of Philadelphia and the vice president and general manager is Mr. L. J. Simkins.

Board is produced on a 5-cylinder paper machine with maximum trim width of 73 inches. The three-stock system can produce board of three laminations: liner, filler and back. Maximum caliper is .045 and minimum is .016.

Stock of approximately one per cent consistency is produced from 90 per cent waste paper and 10 per cent new chemical fiber. Beaters use water controlled to not lower than 100 F. Nearly all processed water is reused after passing through save-alls to reclaim fiber.

The mill has recently completed several phases of a long range mod-

***By W. H. MOUQUIN
and
R. C. GRIFFITH**

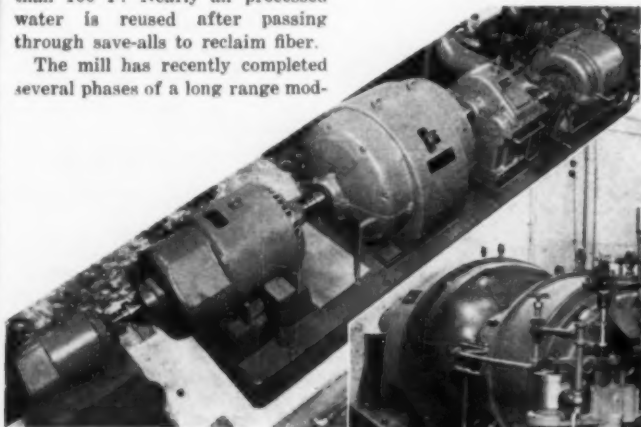
Heat balance economy and accurate process control are principal features of this modernization program. Unusual elements in accomplishing these goals are parallel operation of a back-pressure turbine driven a-c generator with Diesel units, and use of a d-c generator driven by the same turbine to supply power to the d-c paper machine motor.

ernization program. Improvements that are of primary interest only to specialists in the paper field are merely mentioned here. The large investment in power and steam equipment, however, should be of interest to all processing plant engineers and is discussed in detail.

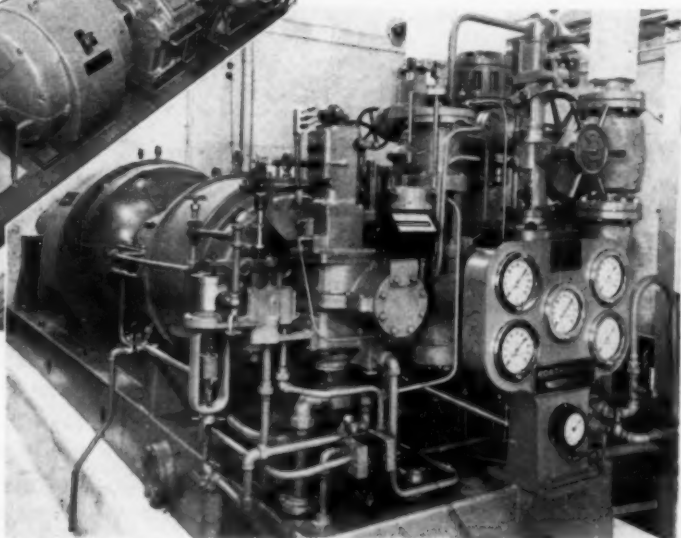
Principal items included in the modernization program are:

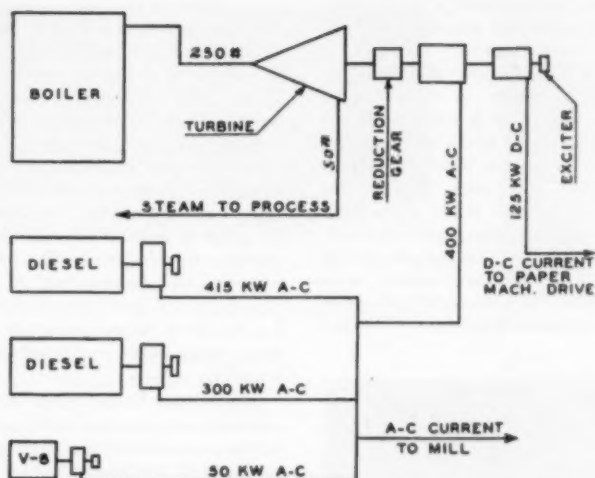
- 1—New power plant consisting of 1 turbine and 2 Diesel units
- 2—D-c motor drive for paper machine, replacing steam engine paper machine drive.

* Mr. Mouquin is Regional Steam Turbine Representative for Worthington Pump and Machinery Corporation. Mr. Griffith is Plant Engineer for Miami Paperboard Mills, Inc., at Miami.



The view at right shows the governor end of the steam turbine. The illustration above shows the arrangement of equipment: from left to right — exciter, 125 kw d-c generator, 400 kw a-c generator, reduction gear, turbine.





Sketch showing general arrangement of equipment. Steam from the boiler goes to the turbine at 240 pounds, and exhausts to process at 50 pounds. Alternating current is supplied by the turbine and Diesel units. The 50 kw emergency generator is not normally operated. D-c current from the generator on turbine shaft goes direct to the paper machine drive. The turbine speed is governed from exhaust pressure to hold process steam at 50 pounds, allowing the a-c generator load to vary. The Diesel driven generators are governed to maintain frequency, with one normally blocked on constant load, and the other handling the electrical load swings.

- 3—2 new Unifiners to refine stock
- 4—New pulper to replace breaker beater
- 5—New screens
- 6—Complete reconditioning of liner beaters
- 7—Installation of laminating and sheet lining equipment
- 8—New waste paper baling plant and warehouse
- 9—Complete chlorination of all mill water, including deep well, white water return, and cylinder fan pumps. The system was provided by Wallace & Tiernan Co., Inc.
- 10—Hurletron caliper control of paperboard
- 11—Vapor absorption system.

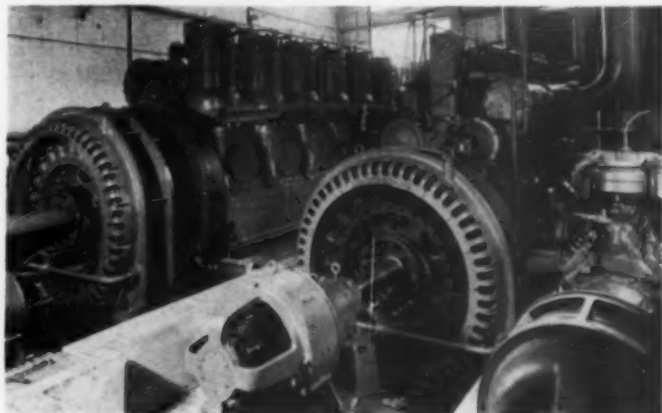
Power Improvements

The power modernization program consists of new steam and power generating equipment, installation of a d-c motor paper machine drive in place of an old steam engine, and more extensive use of synchronous motors to drive processing equipment.

Process steam demand for the plant is about 13,000 lb/hr at 50 lb

pressure. Electrical demand averages 650 kw with a high of 915 kw for a 15 minute starting up period in the beater room. Water requirements are 900 gpm. A 600 gpm deep well pump is used for start-up and cooling purposes. The process operates on a purified white water system supplied by a 1200 gpm pump. Plant power factor is now estimated at 70 per cent, but is expected to become leading when all planned

The unit in center is a 415 kw Fairbanks-Morse Diesel, 2 cycle 400 rpm. At left is a 300 kw Fairbanks-Morse unit, 2 cycle, 300 rpm. The 50 kw, Ford V-8 driven emergency generator is partially visible at right.



synchronous motors are installed and operating.

The new power equipment is designed to provide maximum fuel economy through use of turbine exhaust for process heating. Steam from the boiler passes through the turbine and exhausts to process. Output from the generators is controlled by turbine exhaust demand and the plant electrical load is supplemented by Diesel generators. With an increase in process steam demand more electrical load is taken by the turbine. One Diesel generator operates on base load and the other "floats" on the line. All additional electrical power needed in excess of that available from the turbine (controlled to supply necessary exhaust steam for process) is supplied by the Diesel units.

Boiler

Steam at 250 psi, saturated, is produced in a new Babcock & Wilcox Company integral furnace boiler at an average rate of 26,000 pounds per hour. Bunker "C" fuel oil is steam atomized. Boiler operation is controlled by Bailey equipment. The feedwater heater and softener were supplied by Cochrane. There is one electric driven and one turbine driven boiler feed pump.

Generating Units

A Worthington turbine and reduction gear drives a 400 kw a-c generator and a 125 kw d-c generator.

Steam from the boiler at 240 psi passes through the turbine and exhausts at 50 psi for process operations. Output from the turbine generators is controlled by the exhaust demand and the plant load is supplemented by the two Diesel generators. There are two Fairbanks-Morse Diesel units, one 415 kw and the other 300 kw. Both are direct connected and the larger unit operates at 400 rpm, the smaller at 300 rpm. The 300 kw unit is set for constant load, and the 415 kw unit carries the load swings. The plant

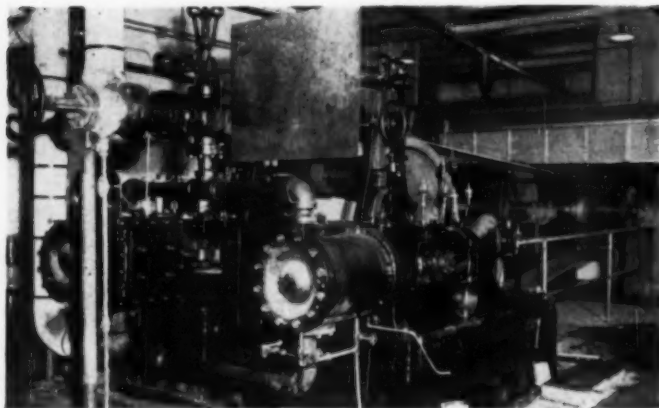
is also provided with a 50 kw emergency generator driven by a Ford V-8 gasoline engine.

The turbine-generator was selected primarily to drive the d-c generator which is connected to the paper machine motor drive. It had been determined that for almost any load on the paper machine, the turbine selected would balance out the demand (driers, etc.) for steam. When the mill is in full production, the back pressure control is in operation. In addition to preventing any sudden decline in steam demand

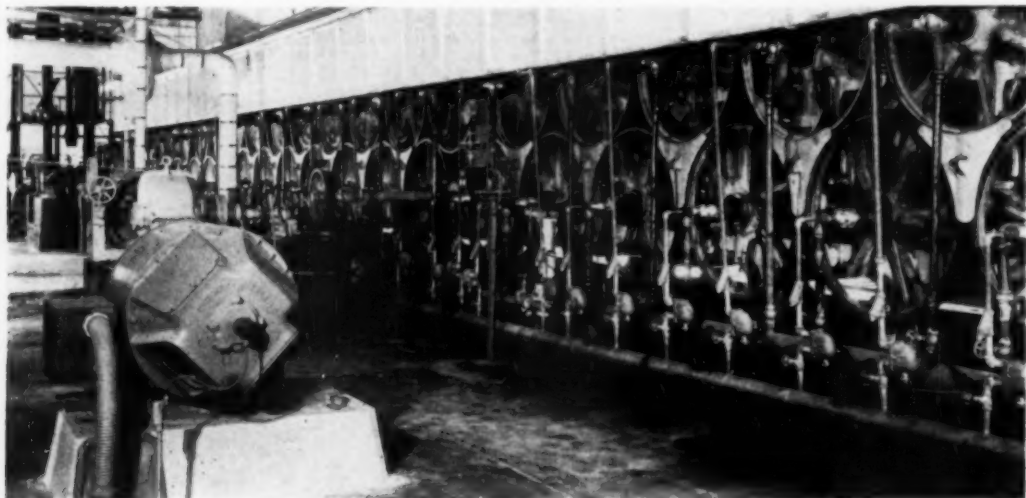
from upsetting the paper machine, the back pressure control is fitted with a stop. This stop prevents the turbine from dropping load under 125 kw. With the standard governor set-up, this will always be direct current load, and is sufficient to drive the paper machine. The turbine is also designed to deliver full load under emergency conditions. In order to save steam, and incidentally to remain within boiler capacity, the turbine will if required operate indefinitely exhausting to atmosphere—although its basic design is for back pressure at 50 psi.

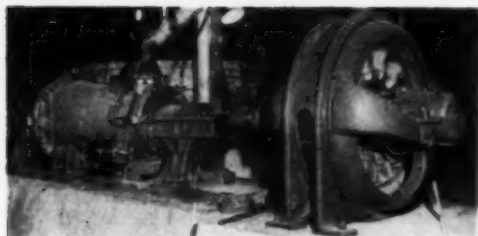
The turbine is also fitted with a solenoid valve installed in the oiling system connected to the back pressure control. In the event of failure of either of the Diesel generators, this solenoid will operate to drop the exhaust pressure governor out of service. This will enable the turbine to carry all load regardless of process steam demand. The danger of a rise in pressure in the process steam line is overcome by installation of a suitable relief valve.

The arrangement of the unit is a little different from ordinary design. It was decided to use full base plate support under the turbine, gear, 400 kw a-c generator, and 125 kw d-c generator. The load carrying capacities of the generator shafts were carefully checked. Only standard design units were desired. The



These views give a dramatic comparison of the old steam engine paper machine drive, above, and the new d-c motor drive, below. The small black object on end of motor is the tachometer generator which furnishes the control impulse for the electronic governor. The air ducts seen above the paper machine remove 90,000 cfm of moist air.





Noble and Wood unifier coupled to 200 hp synchronous motor.

decision was to double extend the generator shafts, and overhang the d-c exciter. Calculations indicated the possibility, in fact strong possibility, of exciter trouble, but the ultimate decision to build an inexpensive concrete support for the exciter has resulted in completely trouble free operation.

Paper Machine Drive

The new 112 hp d-c motor drive, which replaces an old steam engine that formerly drove the paper machine, is one of the most advantageous features of the modernization program. Engineers of the Peninsular Armature Company helped work out details of this drive along with its very exact control.

Paper machine speed control is accomplished by a closed type electronic speed regulator and governor employing a tachometer generator coupled to the shaft of the 112 hp d-c motor with motor fields excited by a separate motor generator set.

Output from the tachometer generator is fed into the electronic regulator and governor which controls the output voltage from 2 thyatron tubes used to excite the field of the 125 kw d-c generator. The d-c generator leads are connected to the armature circuit of the motor through a motor operated circuit breaker. A pair of Sel-syn motors are used for speed control and are actuated either from the panel or by remote control at the wet end of the paper machine.

Synchronous Motors

A new 75 hp synchronous motor will drive the new pulper. This replaces a 125 hp slip ring motor that previously drove a breaker beater. A 150 hp synchronous motor driving the unifier replaces one 75 hp and one 100 hp induction motor used previously for Jordans.



Switchboard. D-c motor control on left was incomplete at time photo was taken. Next, board for 415 kw Diesel; next, board for 50 kw V-8 unit; next, board for 300 kw Diesel. Right, board for turbine, and swing panel for synchronizing generators.

A 200 hp synchronous motor on another unifier replaces a 300 hp induction motor that drove the filler Jordans.

With these changes all large motors will be synchronous, except the d-c paper machine drive. Power factor should be slightly leading after all synchronous motors are placed in full service.

Caliper Control

The Hurlotron caliper control will consist of three gauging heads at the wet end, along with control panel, stock controller at head box, visual indicators and 24 hour graphic chart for the gauging points.

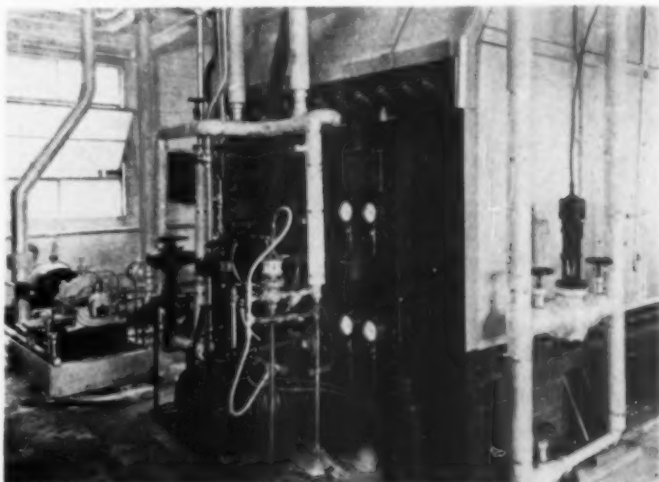
Alarm lights indicate when control is out of range.

At the dry end, there will be two gauging heads mounted after the calender stacks to indicate finished sheet caliper, alarm lights and 24 hour graphic charts are included. These will not control operation, but are very important as constant checks for highest quality. This equipment was furnished by Electric Eye Equipment Co.

Vapor Absorption System

Plans are underway to provide a vapor absorption system. Air will
(Continued on Page 69)

Front of boiler showing control valves and motor driven feed pumps. On extreme right is Bailey feedwater level control valve.



Conditioned to Exact Production Requirements

AIR FOR NEW SPUN RAYON PLANT

Is provided by Modern Highly Efficient System

2200 ton refrigeration plant, coordinated with a 10 station air conditioning and distribution system supplies individual requirements of 8 mill sections.

Southern Power and Industry Report
Based on information furnished
by R. A. Piske, Engineer, Atlanta
District, Carrier Corporation

THE new 64,000 spindle spun rayon plant of Robbins Mills, Inc., at Raeford, North Carolina, is to the best of our knowledge the second completely air conditioned mill of its type built in this country. The first, also a Robbins plant, was built at Aberdeen, North Carolina, in 1948. The principal product of the mill is men's suiting produced from blends of Dacron, Orlon, Rayon and Nylon.

Early in the summer of 1950 Carrier Corporation was selected to work with Biberstein & Bowles, the Architects and Engineers, to help develop the air conditioning system design. C. M. Guest & Sons of Greensboro were selected as general contractors. The experience

gained from designing the air conditioning system at the Aberdeen plant was fully utilized to provide the new Raeford mill with the ultimate in modern air conditioning.

The mill layout finally agreed upon resulted in a main building 430 feet wide by 780 feet long. There are eight individual manufacturing areas — each requiring specific temperature and humidity conditions for best performance.

Separate Systems Required

After considering the size of the mill and the size and requirements of each manufacturing area, as well as the temperature and humidity to be maintained in these areas, the engineers decided that separate

conditioning systems would be required for the following areas:

- 1A—Pin Draft and Convertors
- 1B—Roving
- 2A and 2B—Spinning
- 3A and 3B—Twisting
- 4—Preparation
- 5—Weaving (A)
- 6—Weaving (B)
- 7—Cloth inspection

Each system had to be designed to hold its own temperature and humidity conditions and all of them had to be flexible within certain allowable variations. The overall humidity variation was from 50% to 75% at 80 degrees dry bulb temperature. At any setting within the specified range, the system had to be guaranteed to maintain conditions with plus or minus 2 degrees dry bulb and plus or minus 2½% relative humidity.

A complete load analysis was made and the results tabulated for each of the eight areas. These figures indicate that the heat transmission load (due to outside conditions) represents only 8.3% of the total, and the heat generated by the machinery operating inside the areas represents 72% of the total. This does not include lights, peo-

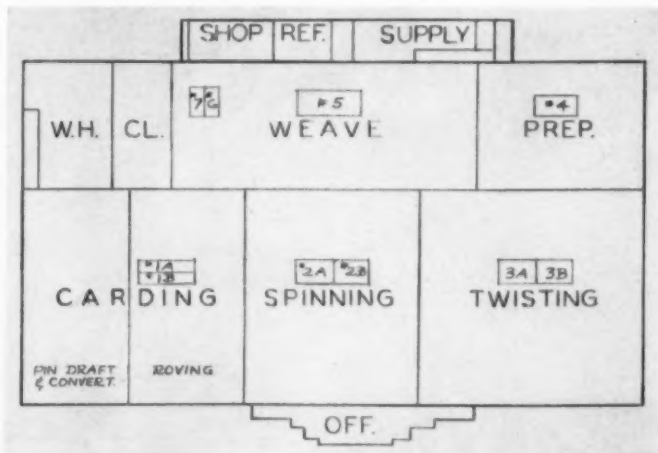


Fig. 1. Plan view of mill, showing location of principal air conditioning equipment. The refrigeration room is on the main floor level, but air conditioning systems are in penthouses on the roof and are represented by the numbered rectangles.

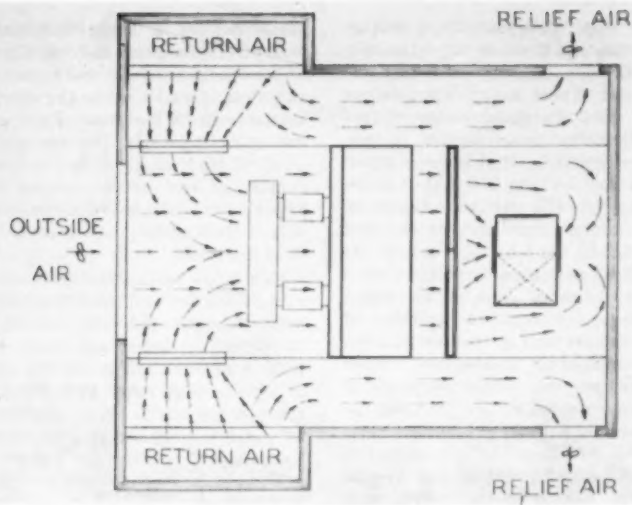


Fig. 2. Air Flow Diagram.

ple and outside air heat. From this it is obvious that system design for this type of job is determined by internal load, instead of heat transmission and sun effect as in the case of most comfort cooling installations.

"Split" System

Because of the highly concentrated loads in the spinning, twist-

ing, and weaving areas, the best solution was to use a "split" or supplementary atomization system in each of these areas, while an "all-air" system was indicated for the remaining areas.

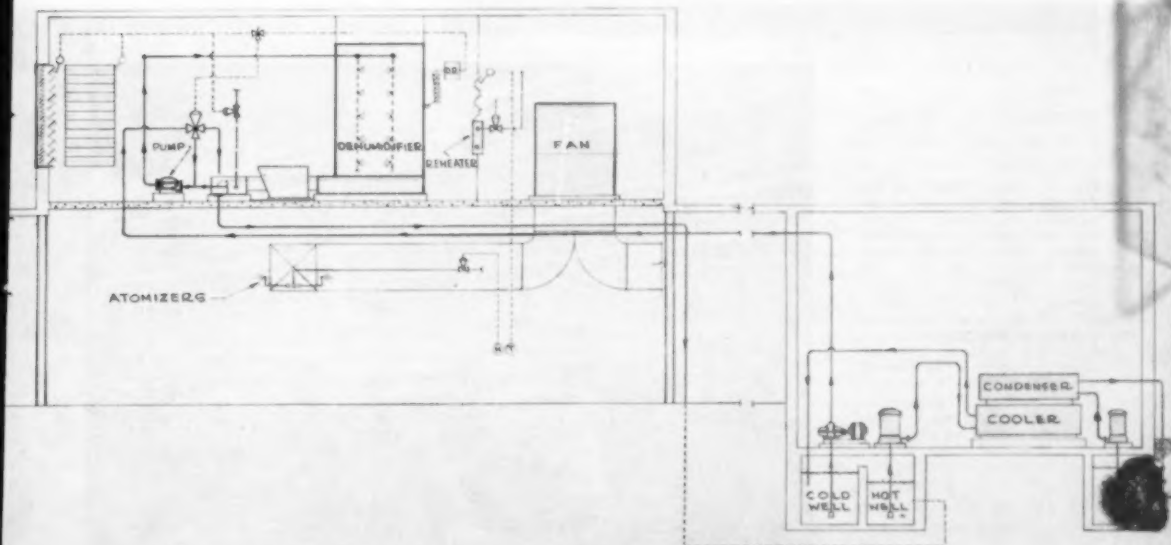
Briefly, the "split" system is one which combines the saturated air delivered from the central station humidifier with supplementary room spray heads located in front

of the duct outlets to atomize water and add supplementary moisture directly to the room. The atomized water absorbs some of the sensible heat generated in the room and turns into water vapor. The air is cooled by adiabatic exchange. Temperature is reduced approximately $8\frac{1}{2}$ °F for every grain of moisture added to each cubic foot of air. Thus the total quantity of air supplied to the room can be reduced by letting the atomized water absorb its portion of the load.

A study was made of the economic balance between air quantities and refrigeration machine operation. Obviously, the more supplementary moisture added to a system the less air required, but the system is penalized by the necessity of maintaining a lower dewpoint. The lower the dewpoint, the sooner the refrigeration machine must be turned on in the spring. Therefore it was decided to base all system design on straight air for the lowest level of humidity, and with this quantity established, then the necessary amount of moisture to be added to maintain the highest level of humidity was calculated.

The next step was to determine the size of the air handling systems which would be required to maintain conditions in each area of

Fig. 3. Schematic diagram showing arrangement of equipment.



the mill. The best locations for the equipment systems were in penthouses located at the most desirable points on the mill roof. This eliminated large trunk ducts running across the mill, and resulted in each manufacturing area being served by a penthouse located on the roof immediately above it. Because of the large air quantities required for spinning and twisting operations, a double penthouse for these areas was provided—thus giving a maximum of 175,000 cfm for any one system.

Duct distribution systems were worked out to give the best possible distribution of air to maintain uniformity for the various machinery areas, while at the same time holding the duct sizes and lengths to a minimum, and minimizing interference with the lighting system and other service items.

Refrigeration Plant

All of the refrigerating equipment is located in one large room 50 feet by 75 feet at the rear of

the mill. Two centrifugal refrigeration machines of approximately 1100 tons capacity each are installed. These machines are driven by 1000 hp synchronous motors with unity power factor. A two-compartment chilled water sump of the hot and cold well type was designed to give maximum flexibility for the multiple systems required to handle the job.

Each penthouse is supplied by a chilled water zone pump which pumps the required quantity of chilled water for that system and is completely independent of all other systems. Thus the pump or pumps needed at any time may be operated, without unnecessary operation of others. Each system is equipped with a three-way by-pass valve located at the recirculating pump suction which by-passes the chilled water back to the refrigeration room as the load on the system falls off and less chilled water is required to maintain the dew-point.

Since some of the manufacturing

areas require a lower dewpoint than others, in spring and fall some of the conditioning systems may require refrigeration while the other systems can be operated on evaporative cooling only. The arrangement of individual chilled water supply for each system makes it possible to operate refrigeration only in those systems which require it at the time.

Two large vertical chilled water pumps, one for each machine, take water from the hot well, circulate it through a cooler, and pump it back to the cold well where the individual chilled water zone pumps can pick up the required quantity of water to serve their particular systems.

Distribution

Each central station system is equipped with specially designed self cleaning strainers that require a minimum of attention. Stainless steel baffles and eliminators and tanks were furnished for all air washers in order to reduce maintenance. All relief dampers are located at a central point in each penthouse so that they can be readily cleaned.

The design is such that the air flow pattern is constant throughout the year regardless of whether refrigeration equipment or evaporative cooling equipment is in operation. An important feature is that the air tends to flow back to the penthouse, through openings in the

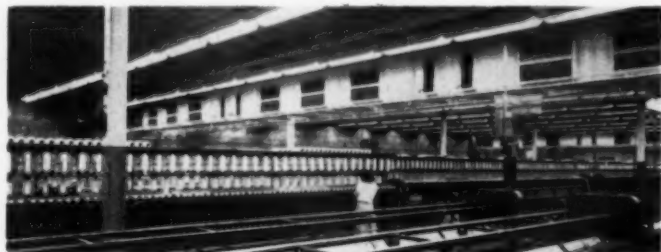


Fig. 4. These views of the Aberdeen mill show part of the spinning department (above) and the twisting department (right). Air outlets with atomizers before each grill are clearly shown in the upper portion of each photograph.

The Raeford installation, described in this article is not sufficiently complete to permit good photographs. At Raeford, all atomizer piping is enclosed within the ducts to improve appearance and prevent lint from accumulating on piping.



penthouse floor, at all times and collects at a central point rather than being distributed over the walls of the building, or perhaps on ceilings, as would be the case if small individual relief air "dog houses" or monitors were used.

All atomizer air and water lines were run inside the ducts so that lint would have no opportunity to hang up on them. This is an improvement over the Aberdeen installation (see Fig. 4). The Rae-ford arrangement tends to reduce maintenance, and also improves the appearance of the system. Outlets in the weave areas are provided with "snap-in" type frames which allow the outlets to be readily removed for cleaning. Splash proof motors are provided on all pumps, and fan motors are provided with moisture resistant windings.

Controls

In a mill of this size it is important to concentrate the control system as much as possible to minimize time required in operation. On a large control panel board located in the refrigeration room are mounted eight summer-winter switches, one for each of the penthouse systems. By locating these control switches in the refrigeration room, the operator can switch as many of the systems on to refrigeration or evaporative cooling as required, without having to walk across the roof from penthouse to penthouse as changes are called for. A red signal light wired into an outdoor wet bulb recorder shows the engineer when the outdoor wet bulb rises to a predetermined level—indicating that he must turn on refrigeration machines.

The recorder controllers for the centrifugal refrigeration machines are likewise located on this panel, so that the engineer can tell at a glance exactly how the refrigeration plant is performing. Since good dewpoint control is the heart of an air conditioning system of this type, where close limitations on temperature and humidity are required, it was decided that reset type dewpoint controllers with averaging bulbs would be furnished for each central station system. These controllers are located on a panel in each penthouse.

Room temperature is maintained

by volume dampers and reheat coils located either in the penthouse apparatus or in the ducts. In those systems which are provided with supplementary atomization, a hygrostat maintains the required humidity by cycling the atomizers. All room control stations are mounted in aspirator cabinets to assure good circulation of room air over the instruments.

The chilled water in the cold well is maintained at a constant temperature by a recorder controller which governs the position of the suction damper on the machines.

The magnitude of this air condi-

tioning installation may be visualized by considering the following figures. The combined capacity of all pumps installed is 43,000,000 gallons per day. The total air handling capacity of all systems is 1,158,000 cfm. The entire volume of air handled in a year is equivalent to a 4 foot layer over the state of North Carolina. The complete air conditioning system requires 3,600 connected horsepower. The refrigeration machines have a capacity sufficient to make 4,400,000 pounds of ice each 24 hours—a block of ice 20' x 35' at the base, and as high as a ten-story building.

Report on Power Modernization

(Continued from Page 65)

be heated from the 50 pound turbine exhaust through fin type exchangers and delivered at 190 F between the driers. Air flow is approximately 30,000 cfm. If calculations are correct, this improvement will increase production by 10 per cent, and use 4000 lb of exhaust steam in the summer and 5200 lb in winter. This is based on average temperature of 70 F year round. A-c power generation will be increased by approximately 75 kw. Thus, the system will pay its own way and help write off capital investment by providing by-product power.

Improvements and Results

The improvements to paper making machinery are actually a contributing factor of improved power supply. The new pulper will furnish uniform stock and more of it, with 40 per cent less power consumption. The unifiers, by preparing fiber to uniform size, will give better formation, and will increase drying rate. Anti-friction bearings on presses reduce power and increase production. Addition of large synchronous motors will greatly improve power factor, and thereby, reduce voltage drop, improve speed control, and reduce ampere load on the electric generators. The vapor absorption system will increase mill output and provide more by-product power.

The new power equipment is

especially selected and installed to give the best possible heat balance through full use of turbine exhaust for drying and heating, and use of highly efficient Diesel units for additional power and regulation.

Woodward governors were purchased for all generating equipment to maintain full control of the several types of units, and give the coordinated operation necessary to secure full economy and regulation benefits of the system. Full consideration has been given to the importance of eliminating power and steam interruptions; and the new equipment is making appreciable savings in this regard.

The entire program is proving satisfactory, and when complete operating procedures are perfected, it is expected that all planned benefits will materialize.

THE EDITORS were particularly impressed with this description of an industrial plant modernization program, because the procedures followed here resulted in greater output and better economy without actually expanding production facilities. Today's need for increased production, together with present equipment and materials shortages, places an extra premium on top quality plant engineering. Expenditures for overall plant modernization normally give better return than the same money invested in additional production units.

Mississippi Power Company's

PLANT SWEATT

Provides Power to Meet Fast Growing Loads

Not so long ago Mississippi Power Company got its energy from small isolated generating stations, then additional needs came by "high-line" from Alabama. — And now its own big generating plants are answering industry's call for more and more power.

MISSISSIPPI POWER COMPANY'S newest generating station, Plant Sweatt, located about six miles southwest of Meridian, Mississippi, was placed in commercial operation in June 1951. At that time it was announced a second 40,000 kw unit would be added, with construction scheduled to begin immediately for mid 1953 completion. Plant Sweatt is the second large new generating plant constructed by the Company since early 1945. Plant Eaton was described in the September 1945 issue of SOUTHERN POWER AND INDUSTRY.

The new plant generates electricity at 13,800 volts and this is stepped up to 110,000 volts in the plant substation for transmission

to the farms, homes, businesses and industries of southeast Mississippi. All communities served by the company are connected to Plant Sweatt through a high voltage interconnected transmission network.

Plant Sweatt, like Plant Eaton, is a gas fired high pressure, steam electric generating plant. However, unlike Plant Eaton, it is built entirely above ground level. The first major phase of construction was the driving of more than 700 ten inch steel pipe pilings.

The plant building has asbestos transite siding with the exception of the office area which has brick walls.

Although this is essentially an indoor type plant, some equipment

is outside the building. This includes draft fan equipment and the hot process water softener.

Foundations

A thorough foundation investigation revealed that surface soils in this area were too soft for mat or footing foundations. The groundwater table is from 0 to 4 feet below the ground surface. The typical soil profile, from the surface down, is:

- (1) Soft sandy clay—15 feet thick.
- (2) Loose fine sand—20 feet thick.
- (3) Dense lignite—2 feet thick.
- (4) Black laminated silty clay—15 feet thick.
- (5) Extremely dense fine sand—90 feet thick.
- (6) Irregular beds of limestone.

As a result of these studies, it was decided the plant building,



The plant is built entirely above ground and all structures are supported on piles.

cooling tower, oil storage tanks, stack and even the transformers should be supported by pilings. This, of course, brought up the question of what would be the most efficient and economical type of piling to use. After careful consideration it was decided that ten inch steel pipe pilings filled with concrete would give the best performance under the prevailing conditions and with reasonable cost. Over seven hundred pilings were finally driven to depths ranging from 45 to 75 feet. Jetting was employed in driving the piles down through the lignite section to prevent the long piles from receiving support in the soft strata.

The base slab for the plant building was poured over the pilings. It is heavily reinforced concrete three feet thick, and with the pilings provides a foundation with an excellent safety value in bearing power.

Cooling Water Supply

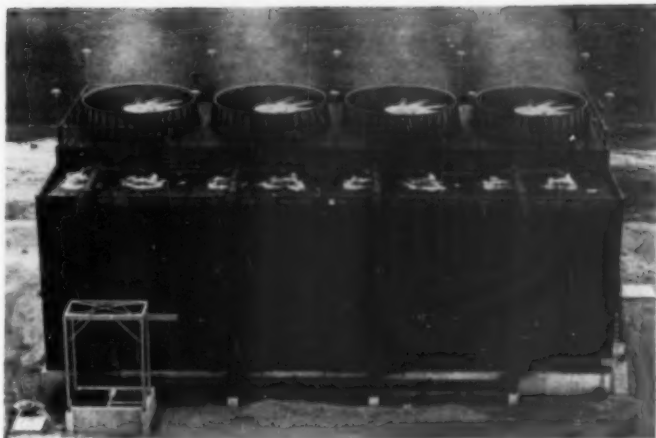
Due to the fact that no stream in the area could provide an ample and dependable source of cooling water, three deep wells were drilled to depths of approximately 1000 feet for this purpose, and a cooling tower was erected. This is the first cooling tower in use on the Southern Company system. It is four celled, double flow, wood filled with induced draft and has a capacity of 35,000 gpm.

Turbine Generator

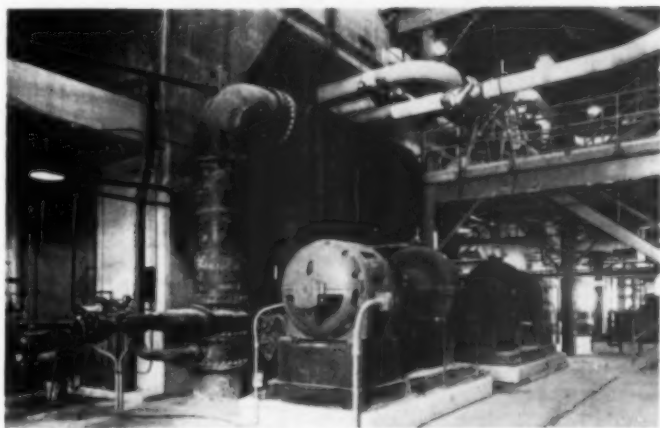
The turbine is a General Electric, tandem compound, double flow 3600 rpm, 40,000 kw nameplate rated unit supplied with throttle steam at 850 psi and 900 Ftt. Steam is extracted at the 4th, 7th, 12th, 15th, and 18th stages for feedwater heating.

The generator is hydrogen cooled and has a nameplate rating of 40,000 kw at 0.85 power factor and 0.5 psi gage hydrogen pressure. It is designed for 13,800 volt, 3 phase, 60 cycle service with direct connected main exciter.

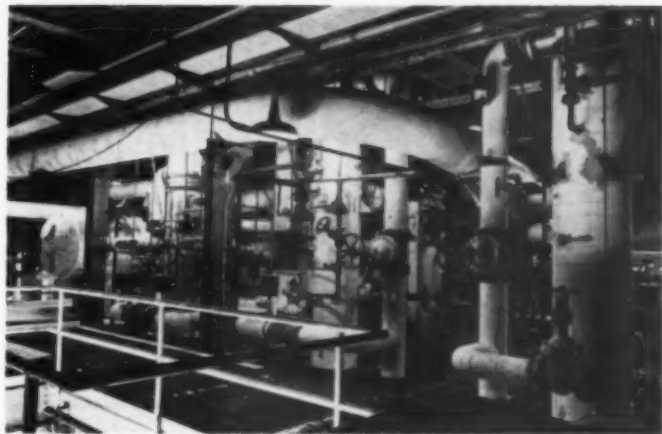
The turbine exhausts into a horizontal, two pass, divided water box, surface type condenser with a cooling surface of 32,500 square feet, which is provided cooling water by two single stage, horizontal,



Cooling tower in operation, as seen from plant building.



Condenser and pumps are installed at ground elevation.



View showing heaters and interconnecting steam lines.

centrifugal pumps with a capacity of 16,350 gpm each.

The generator is directly connected to a 45,000 kva, self-cooled or 56,250 kva forced air cooled oil immersed three phase transformer to step up the voltage from 13,800 to 110,000 volts for transmission.

The excitation voltage is regu-

lated by an amplidyne motor generator set controlled from the 13 kv bus voltage.

Boiler

A single drum, radiant type, water tube boiler with a normal capacity of 360,000 pounds per hour and a maximum capacity of 425,-

000 pounds per hour and a single pendant, continuous tube type superheater with 10,025 square feet of heating surface provides steam at 850 psi and 900 Ftt to the turbine.

Although this plant will normally operate on natural gas from Mississippi fields, it can also be operated on oil. A 20,000 barrel capacity fuel oil storage tank is located near the plant for emergency use.

Auxiliary Equipment

Boiler Feed Pumps:

The feedwater is supplied to the boiler by two seven stage, diffuser type centrifugal pumps, one of which is a standby. Each is capable of supplying 1025 gpm of feedwater at 295° F at a total discharge head of 3000 feet of water. They are driven at a constant speed of 3550 rpm by 990 hp squirrel cage induction motors.

Feedwater Heaters:

The feedwater heating cycle consists of five extraction heaters—two low pressure closed, two high pressure closed, and one open or deaerating. The low pressure heaters have a capacity of 375,000 pounds per hour and the open and high pressure units have a capacity of 450,000 pounds per hour. A continuous tube, 18,279 square feet, economizer provides the final stage of feedwater heating.

Evaporator:

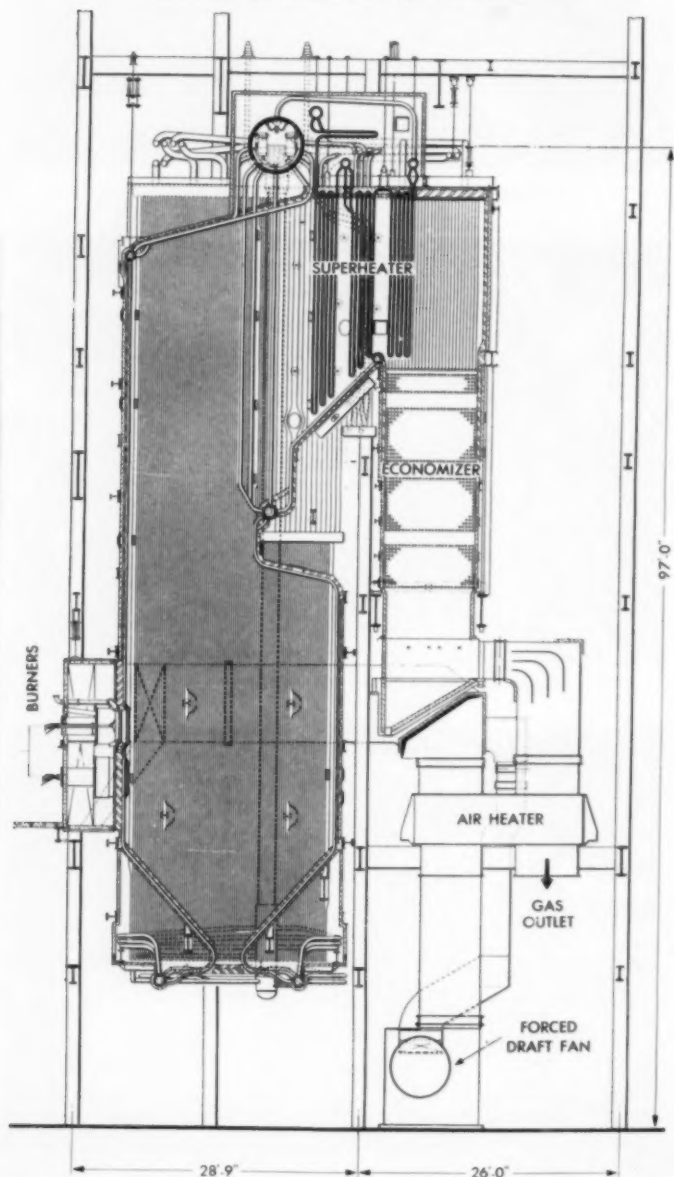
Feedwater makeup is supplied by a horizontal, bowed tube evaporator which has 400 square feet of heating surface and is capable of supplying 15,000 pounds of makeup per hour.

Fans and Air Heater:

The draft system consists of a forced draft fan, an induced draft fan, a preheater and a 175 foot stack. The forced draft fan is driven by a 720 rpm, 250 hp squirrel cage induction motor and is capable of supplying 110,000 cubic feet of air per minute at 140° F with a static pressure of 7½ inches of water.

The induced draft fan is driven by a 600 rpm, 600 hp squirrel cage induction motor and has a capacity of 185,000 cubic feet per

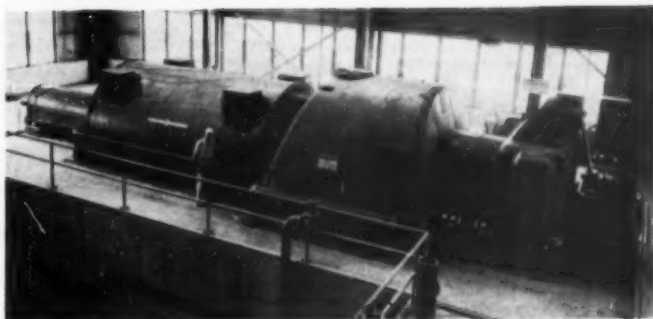
Section of Boiler showing arrangement of equipment.



Turbine-generator unit and operating floor are above conventional elevation because there is no condenser pit.

minute of flue gas at 310° F with a negative static pressure of 9 inches of water.

The air is heated by a regenerative preheater which has 37,300 square feet of heating surface and is capable of heating 435,000 pounds of air per minute from a temperature of 100° to 449° F.



PRINCIPAL EQUIPMENT—Plant Sweatt, Mississippi Power Company, Meridian, Miss.

GENERAL DATA

Name of Station.....Plant Sweatt
Station Site.....Meridian, Mississippi
Total Generating Capacity.....40,000 kw nominal rating
Total Boiler Capacity.....425,000 lb per hr at 880 psi and 900° F.
Cooling Water Source.....Deep wells with cooling tower
Design Engineers.....Southern Services, Inc.
General Contractor.....L. B. Priester & Son

TURBINE-GENERATOR

Turbine.....One—General Electric Co., 40,000 kw, 3600 rpm, 850 psi, 900° F.
Generator.....One—General Electric Co., direct connected, 40,000 kw, 47,958 kva, .5 pf, 1945 amp, 13,800 v, 3 phase, .5 psig hydrogen.

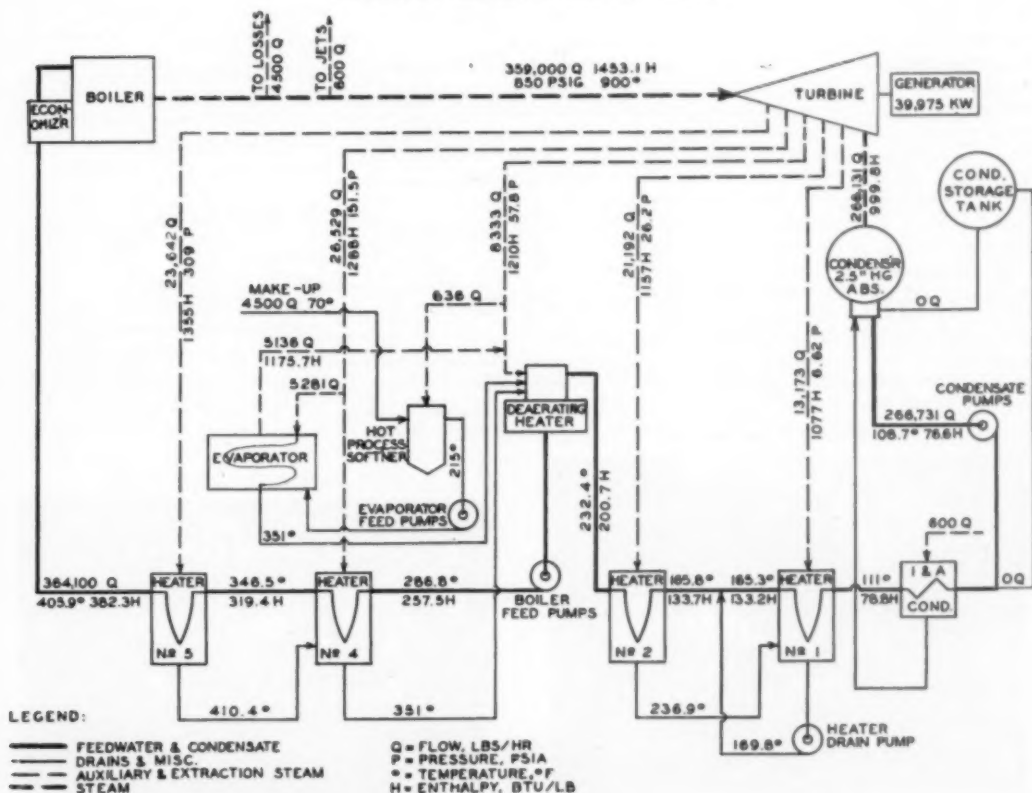
Exciter.....One—General Electric Co., 145 kw, 250 v, direct connected, 3600 rpm.
Generator Coolers.....Four—General Electric Co., vertical single element, 6180 sq ft total cooling surface, 550 gpm cooling water.
Turbine Oil Coolers.....Two—General Electric Co., vertical, closed.
Turbine Oil Filters.....One—Bowers, Inc., 270-540 gph, storage capacity: 320 gal for filter and 2150 gal for oil tank.

CONDENSING EQUIPMENT

Condensers.....One—Ingersoll-Rand Co., horizontal, two-pass, divided water box, 32,500 sq ft cooling surface.

(Continued on Next Page)

Flow Diagram, Plant Sweatt, Meridian, Mississippi



(Continued from Previous Page)

Circulating Pumps Two—Ingersoll-Rand Co., single stage horizontal centrifugal, 1300 gpm each, driven by General Electric, 350 hp, 2300 V, 600 rpm induction motor.
Condensate Pumps Two—Ingersoll-Rand Co., 700 gpm 2 stage, 4 impeller, centrifugal, motor driven.
Air Removal Equipment Ingersoll-Rand Co., 2-stage, twin element, steam jet, with inter and after condenser.
Priming Pumps Ingersoll-Rand Co., single stage, one element steam jet.
Expansion Joints Six—U. S. Rubber Co. (rubber), and seven—Badger Mfg. Co. (copper).
Cooling Tower The Marley Co., Inc., horizontal double flow, wood filled, induced draft, 25,000 gpm.

SWITCHBOARD EQUIPMENT

Switchboard and Control Panels, panels and assembly by Clement Electric Co. 5—electrical control, 5—boiler control, 3—relay, and 5—turbine control. Ammeters, voltmeters, synchroscope, frequency meter, and load indicator, by Weston Electrical Instrument Corp. Ampidyne voltage regulator by General Electric Co.

STEAM GENERATING EQUIPMENT

Boiler One—Babcock and Wilcox Co., single drum radiant type. Boiler surface 2945 sq ft, water walls 4828 sq ft, 425,000 pounds per hour maximum, 260,000 lb normal, 874 psig at superheater outlet operating, 1946 psig design. Drum 60" nominal diameter, 35 ft 5 in. long. Steel casing.
Economizer One—Babcock and Wilcox Co., continuous tube, 18,272 sq ft surface.
Superheaters One—Babcock and Wilcox Co., pendant, continuous tube, 16,025 sq ft, 900 F.
Furnaces One—Babcock and Wilcox Co., radiant.
Air Heaters One—Air Preheater Corp., Ljungstrom, 27,300 sq ft, 425,000 lb per hr, inlet 190 F, outlet 449 F.
Soot Blowers Diamond Power Specialty Corp., 925 psi, carbonized steel, 2". Installed in economizer only, but others to be added if coal is burned.
Blow-Off Valves Six—Manning, Maxwell and Moore, Inc., Hancock, 1½" globe.
Water Columns Diamond Power Specialty Co., "Bicolor", "Reliance Gage Column Co." "Eye-High."
Safety Valves Crosby Steam Gage & Valve Co., nozzle type.
Blow-Off Tank One—Snyder Tank Corp., 55 cu ft
Gas Burners Six—Babcock and Wilcox Co., ring type, 1500 cfm each.
Combustion Control Hagans Corp., air activated.
Fuel Oil Pumps DeLaval Steam Turbine Co., 2, lighter oil and 2 bunker C.
Fuel Oil Heaters Two—Davis Engineering Corp., Pararoll, tubular, 150 gpm, 75 lb steam.
Gas Pressure Regulators One—Fisher Governor Co., V-port butterfly, 635,000 cfm, reduction 25 lb to 25 lb.

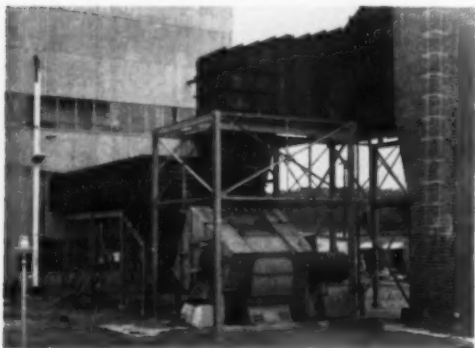
DRAFT EQUIPMENT

Chimney Custodis Construction Co., 16" top internal diameter, 175' high.
Smoke Breaching Steel Construction Co.
Forced Draft Fan One—Westinghouse Electric Corp., Sauravant, 110,000 cfm of 140 F air at 7½" water pt., driven by General Electric Co., 250 hp, 720 rpm, squirrel cage motor.
Induced Draft Fan One—Westinghouse Electric Corp., Sauravant, 185,000 cfm at 316 F and 8" negative water pt. Driven by General Electric Co., 600 hp, 600 rpm, squirrel cage motor.
Air Ducts Steel Construction Co.
Draft Gage One—Republic (8 units).
Draft Controls Hagans, air operated.

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps Two—Pacific Pumps, Inc., 7-stage, vertically split casing, diffuser type, 1025 gpm at 295 F, total discharge head 3000 ft, suction head 205 ft, 3520 rpm. Driven by General Electric Co., 300 hp squirrel cage motor.
Bleeder Heaters Four—Westinghouse Electric Corp., turbine extraction from 4th, 7th, 15th and 18th stages.

Induced draft fan and breaching.



Heating Heaters One—Cochrane Corp., direct contact, jet tray type, 425,000 lb per hr.
Feedwater Regulators One—Northern Equipment Co., Copps, A-2 Flowmatic, two element.
Heater Drain Pump One—Worthington Pump and Machinery Corp.
Evaporator One—Westinghouse Electric Corp., 15,000 lb per hr, 400 sq ft, horizontal, bowed tube, submerged bundle, thermal descaling.
Excess Pressure Regulators Lonergan.
Evaporator Feed Pumps Two—Ingersoll-Rand Co., single stage, centrifugal, 35 gpm each, 3 hp motors.

WATER TREATING PLANT

Filters Three—Cochrane Corp., lifting head type, graded anthracite filtering, 20 gpm each.
Softening Plant Cochrane Corp., desalting, hot process, 60 gpm.

PIPING AND VALVES

Piping Contractor Grinnell Co., Inc.
Covering Contractor North Brothers.
Covering Material The Paraffin Companies, Inc., Praseo, Fabco and canvas, 55% moulded magnesia.
Check Valves Chapman Valve Mfg. Co. and Manning, Maxwell & Moore, Inc.
Gate Valves Chapman Valve Mfg. Co.
Globe Valves Chapman Valve Mfg. Co.; Manning, Maxwell & Moore, Inc.; and Jenkins Bros.
Non-Return Valves Chapman Valve Mfg. Co.
Reducing Valves Fisher Governor Co.
Small Valves Manning, Maxwell & Moore, Inc.; Jenkins Bros., and Chapman Valve Mfg. Co.
Automatic Relief Valves Manning, Maxwell & Moore, Inc., consolidated type.
Traps Armstrong Machine Works
Drainers Fisher Governor Co.

INSTRUMENTS

Flow Meters Hagans Corp., ring balance type; on turbine, boiler, condensate, and feedwater.
Drum Level Recorder One—Republic Flow Meters Co.
Draft Gage One—Republic Flow Meters Co., 8-unit, vertical scale, dry diaphragm.
Pressure and Vacuum Gages Manning, Maxwell & Moore, Inc. (Ashcroft) indicating, and Republic Flow Meters Co., recording.
Mercury Columns Manning, Maxwell & Moore, Inc.
Thermometer Manning, Maxwell & Moore, Inc.
Conductivity Recorder Leeds & Northrup, a-c Wheatstone bridge.
Master Pilot Steam Gage Manning, Maxwell & Moore, Inc.
Boiler Load Indicator Weston Electric Instrument Corp.
CO₂ Recorder Leeds & Northrup Co.
Barometer Manning, Maxwell & Moore, Inc.

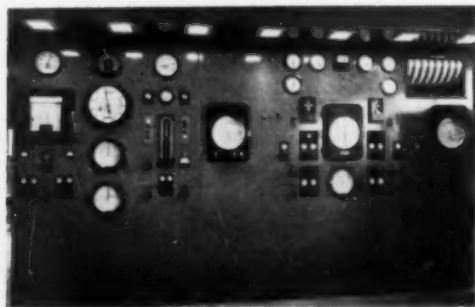
ELECTRICAL EQUIPMENT

Switchyard Structure Contractor Fishbach & Moore, Inc.
Main Transformers One—Westinghouse Electric Corp., 45,000 kva, self cooled, 56,250 kva forced air cooled, oil immerse, 3 phase 13.2/110 kv.
Standby Transformer Maloney Electric Co.
Auxiliary Transformers General Electric Co., 13,200/2,400/375 v.
Oil Circuit Breakers General Electric Co.
Storage Battery Electric Products Co., 21 Exide, 125 v.
Battery Charger Electric Products Co., 3 kw motor generator.

MISCELLANEOUS

House Service Pumps Two—Ingersoll-Rand
Deep Well Pumps Three—Layne-Central Co., 500 gpm each at 30 psi, vertical, turbine type, 1765 rpm. Motors are General Electric Co., one is 40 hp, 500 volt, and two are 50 hp, 2300 volt.
Sewage System Contractor L. B. Priestor & Son
Surge Tanks One—Cochrane Corp.
Air Compressors Two—Gardner Denver Co., one 300 cfm at 100 lb with 60 hp motor, and one 150 cfm at 100 lb with 30 hp motor.
Turbine Room Crane One—Whiting Corp., 100 ton.
Vacuum Cleaning System U. S. Hoffman Machinery Corp.
Water Tanks Steel Construction Co., one—60,000 gal condensate storage, one—10,000 gal clear water tank, and one—30,000 gal house service tank.
Motor Drive Couplings Koppers Co. (Faxon).
Elevator Southeastern Elevator Co.

Boiler operating and control panel.



Improved Water Supply at Roanoke Mills Company

plant investment — — \$3,000
annual savings — — \$25,000
return on investment—800%

By ROBERT J. TUCKER

Plant Engineer
Roanoke Mills Company, Roanoke Rapids, N. C.

How many operations do you have in your plant that require operators to stand idle while processing equipment is filling up with water?

Have you ever checked on how much money is wasted each year by this non-productive time?

Such losses are often difficult to locate. Plant management has become accustomed to these delays. But—are they necessary?

Are you delivering to your machinery the full pressure and flow of water available at the meter on the supply line? Have you checked pipe sizes, length of pipe runs and volume of water flow to the major departments in your plant?

In all probability, a few changes in connections will considerably reduce your employees' idle time with a minimum investment and no material increase in total water consumption.

ABOUT a year ago, the No. 1 mill of Roanoke Mills Company found its dye house falling behind the production of the mill. Considerable overtime operations on week ends were required to keep up.

Operators of the beam dye machines frequently wasted twenty to thirty minutes to fill a machine with water. Operators of the raw stock machines sometimes waited for an hour or more as there was not sufficient water to wash down more than one machine at a time.

These unsatisfactory conditions were due entirely to the low water pressure at the dye house caused by a demand for more water than the piping system would supply. Pressure, however, at the meter supplying the mill and at other points within the mill remained high at all times.

Management was faced with the problem of increasing the dye house production. Processes would either have to be shortened or additional dyeing machines installed to maintain the desired production rate. Attention was immediately centered on the lack of water as the biggest factor restricting production. Time studies revealed that an annual

saving of \$25,000 was possible by eliminating the delays in dyeing caused by low water pressure. Engineering was told to get busy.

Original System

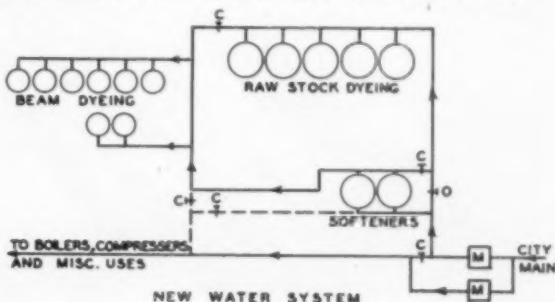
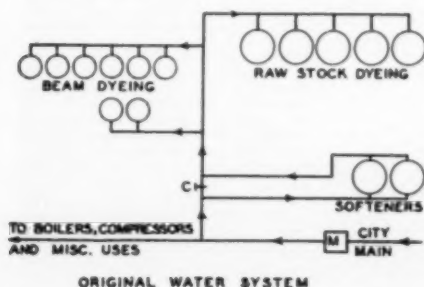
A diagram of the original water supply system to the dye house, showing only by-pass valves for clarity, is reproduced in simple form. Note that all water supply was carried by a 4-in. line. Water for both the beam dye kiers and raw stock machines traveled a considerable unnecessary length of piping to get to the water softeners and back to the dye machines.

New Water System

Study of the revised layout shows that a new 6-in. line was installed to the dye department to double the supply of water. Point of connection to the supply main was moved closer to the meter to reduce the length of piping. Flow of water from the water softeners to the dye machines was split, thus materially reducing friction losses in the piping. By leaving the original system in service, we have fallen heir to a number of emergency inter-connections (shown with a broken line), which were not available before. To minimize pressure fluctuations at the boiler room and other departments, a new

(Continued on Page 79)

Original and revised water supply system for Roanoke Mills Company . . . C-Closed Valve, O-Open Valve, W-Water Meter.



H. E. Bovay, Jr., designer; J. U. Foster, plant manager; and A. Temple, Jr., owner of the Southern Pine Lumber Company of Diboll, Texas. Other phases of the extensive plant modernization are under way and will be covered by future articles in SP&L.



Southern Pine Lumber Company's New Wood Treating Plant

By H. E. BOVAY, JR., and RICHARD B. ROBERTSON

of H. E. Bovay, Jr., Consulting Engineers, Houston, Texas

The second phase of Southern Pine Lumber Company's long range modernization program—a 20 acre wood treating plant. The first phase, covering the handling and processing of lumber, was described in the November issue:

LATE in 1949, Arthur Temple, Jr., vice president and general manager of the Southern Pine Lumber Company, assigned J. U. Foster, manager of the treating

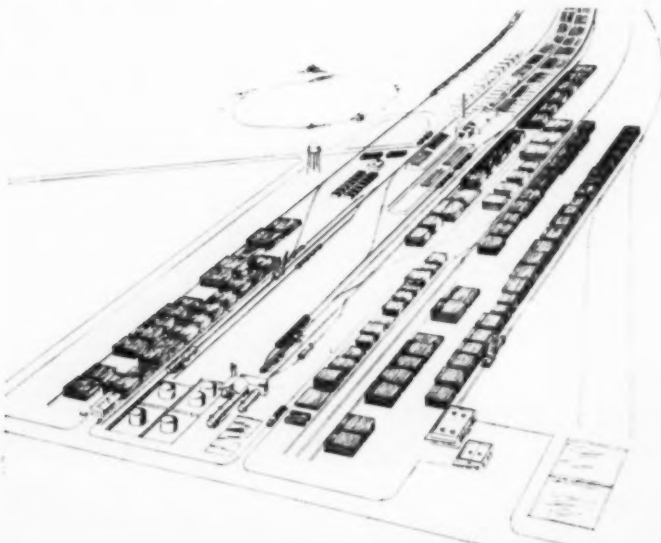
division, and the consulting engineering firm of H. E. Bovay, Jr., to make a complete study of the possibilities of a wood treating plant. Other plants were visited; South-

ern Pine foresters, headed by Kenneth Nelson, made a complete study of their timberlands; the engineering organization prepared cost studies and economic surveys; and market testing was conducted by J. U. Foster and the engineering group.

Ground was broken in April, 1950, and operation started in April of 1951. With the completion of the plant, Southern Pine Lumber Company becomes one of five organizations in the Southwest that

New wood treating plant of the Southern Pine Lumber Company of Diboll, Texas, is located on twenty acres of ground which provides room for the treating building and the cylinders in one area, working tanks and storage tanks in a second area, air drying and storage of poles including a pole peeling machine and sorting station in a third area, and the plant office building and locker and change house in a fourth area.

These areas are separated by distances as required by fire prevention standards but are grouped close enough to be conveniently located with respect to each other. The pole storage yard is laid out for maximum air drying of poles and has 21 railroad switches located on two and one-half miles of track to facilitate the handling of material. All tracks lead directly to the treating cylinders which considerably reduces material handling time.



own and operate their own treating facilities.

It is interesting to note that the first attempt to start up the plant was entirely successful. It was not necessary to shut down for minor changes or even to repack a valve or a pump gland. This is a tribute to the careful and accurate work of the Southern Pine Lumber Company's construction forces.

It was decided that the plant would be equipped with one 8 ft diameter x 82 ft long cylinder for treating with creosote, and one 8 ft diameter x 42 ft long cylinder for treating with pentachlorophenol. This is the most efficient size in combination with standard gauge track. Use of standard gauge track made it possible to tie in with existing railroad trackage to the lumber mill and to the main line railroads. The length of the cylinders was determined by the length of the poles and piling to be treated which in turn was established by both the market and the available raw materials.

Treating Pressure

The treating cylinders were designed for a pressure of 225 psig and for 28-in. vacuum. An outstanding feature of these cylinders is the door hinges which are of original design and permit opening

and closing of the heavy doors, easily by one man.

Steam Line—3600 ft

The lumber is prepared for treatment by either air drying it in the yard or steaming it in the treating cylinders over night. The entire steam supply for this seasoning of material, to power the steam-driven pumps, to heat the working

tanks and to operate the jets for pulling vacuum on the treating cylinders is furnished to the treating plant through a 3600-ft long 6-in. steam line from the sawmill power plant nearly $\frac{3}{4}$ mile distant. This 3600-ft steam line is supported by hangers above ground, trapped at regular intervals, covered by 2-in. insulation, provided with carefully designed bends to allow for expan-

Creosote Treating Process at Southern Pine

1. After the charge is in the treating cylinder and the door is closed, the cylinder is filled with compressed air to 100 lb pressure.
 2. Creosote is pumped into the treating cylinder from the creosote working tank by a centrifugal fill pump until the charge is completely covered and the cylinder is full.
 3. The pressure within the treating cylinder is built up to 180-200 lb by a duplex reciprocating pump.
 4. After the creosote preservative has been permitted to penetrate the charge for a specified time depending on the amount of treatment desired, the treating cylinder is emptied by blow back and by use of the fill pumps and the excess creosote is transferred back to the creosote working tank.
 5. After the treating cylinder is emptied of fluid, a vacuum is pulled on the treating cylinder by first an atmospheric jet called a hogging jet and then a two stage jet to increase the amount of vacuum.
 6. After this vacuum is held for the required amount of time, the vacuum is released, the creosote remaining in the bottom of the cylinder is pumped back to the working tank and the cylinder door is opened for removal of the charge.
- The process for treating with "penta" is the same as for creosote except for pressures used, but the times vary according to the amount of treatment required.

Poles to be treated are run to a pole peeler machine in the storage yard where any bark and knots are trimmed smooth. Tops of the poles are framed and bored. Poles are taken away from the pole peeler by a 1200 ft endless conveyor chain and delivered to distribution bays for sorting according to length and class.



sion and contraction and aluminum jacketed over its complete length.

The lumber to be treated is moved around the storage yard and to the treating vessels on trams by diesel powered locomotive cranes and engines. The first of these cranes was bought second hand, reconditioned, and equipped with a new diesel engine and torque converter for a small percentage of the cost of a new locomotive crane. This system was so successful that a second crane was later obtained by the same procedure.

The change house and locker room is of particular interest since it is thoroughly modern and is designed for cleanliness and worker comfort. The house itself fits the architectural pattern of the plant in that it is constructed of wood framing with log cabin creosoted siding. Wall hung plumbing fixtures are used in order to improve sanitation and make it easy to clean the floors.

The floor is of inexpensive concrete construction, finished with a color pigment to improve its hardness and ease of cleaning. The entire building inside and out presents a pleasing appearance and has a beneficial effect on worker morale in addition to encouraging cleanliness and good habits among the workers.

Waste Reclamation

Another feature of the plant is that waste reclamation is carried out very successfully. Leakage in the plant which normally causes

the control room floor and the area around the cylinders to become very dirty and fouled with penta and creosote has been kept to a minimum. The plant as a whole is very tight and all drainage is carried to waste reclamation ponds. The penta pond and the creosote pond are separate so that fluids will not mix and result in emulsions which are difficult to handle. A large portion of penta and creosote normally lost to drainage is recovered in these ponds and almost clean effluent is finally released to the drainage system.

PRINCIPAL EQUIPMENT

Southern Pine Lumber Company — Wood Treating Plant

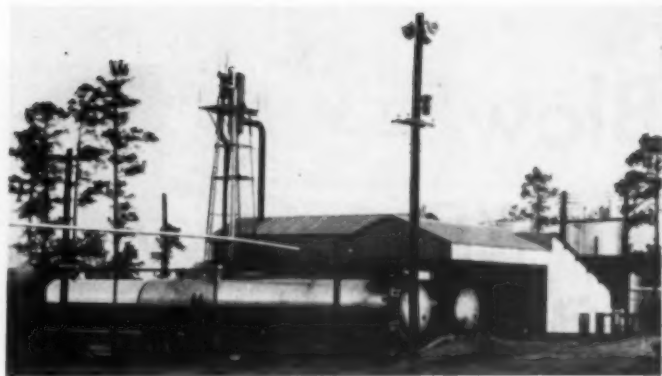
- Switching Locomotive**—1 25-ton Vulcan locomotive with 6 cylinder LaRoi gasoline engine.
- Locomotive Crane**—1 American Hoist and Derrick Co. crane with Cummins diesel engine, 110 hp at 1800 rpm.
- Pole Peeling Machine**—Hurricane Pole Peeling Machine manufactured by Eford Machinery and Welding Company, Bossier City, Louisiana.
- Creosote Filling Pump**—1 Ingersoll-Rand, single stage, horizontally split, double suction, volute type centrifugal pump; driven by a Westinghouse 75 hp, 3600 rpm, 440 volt, 3 phase, 60 cycle squirrel cage induction motor.
- Pentachlorophenol Filling Pump**—1 Ingersoll-Rand, 2 stage horizontally split, single suction, volute type, centrifugal pump; driven by 50 hp, Westinghouse, 3600 rpm, 440 volt, 3 phase, 60 cycle, squirrel cage induction motor.
- Creosote and Pentachlorophenol Transfer Pumps**—2 each Ingersoll-Rand, single stage, vertically split, single suction, volute type centrifugal pumps; driven by a Westinghouse, 5 hp, 3600 rpm, 440 volt, 3 phase, 60 cycle squirrel cage induction motor.
- Air Compressor**—1 Ingersoll-Rand size 14 x 13, horizontal, straight line, single stage, double acting air compressor; driven by Westinghouse 100 hp, 1200 rpm, 440 volt, 3 phase, 60 cycle squirrel cage induction motor.
- Barometric Condenser**—1 Ingersoll-Rand, counter-current flow type, barometric condenser.
- Creosote and Pentachlorophenol Pressure Pumps**—4 National Transit Pump and Machinery Company, 7½" x 4½" x 10" HD, side port, steam driven, duplex reciprocating pumps.
- Water Circulating Pump**—1 Byron-Jackson Company, vertical, turbine type pump; driven by Westinghouse 10 hp, 1750 rpm, 440 volt, 3 phase, 60 cycle squirrel cage induction motor.
- Instruments**—Fulton Siphon Temperature Regulators.
Manning, Maxwell & Moore Thermometers.
Fisher Pressure Regulators.
Ashcroft Bourgas.
Foxboro Combination Vacuum-Pressure-Temperature Recorders and Clocks.
Meriam Mercury Monometers and Site Feed Bubblers.
- Steam Line Insulation and Jacketing**—Rit-Wil prefabricated insulated pipe for use with underground steam piping. Aluminum jacketed fiberglass insulation furnished by the Childers Manufacturing Company of Houston, Texas, for above grade piping.
- Conveyor Chain**—a 1200' long continuous conveyor ¾" x 1½" x 6" was furnished by Lufkin Foundry & Machine Company, Lufkin, Texas.
- Treating Cylinders, Storage Tanks & Working Tanks**—All metal tanks and treating cylinders were built by R. A. Rothchild, Shreveport, La.

Very careful heat balance studies of the lumber milling operation, which had been made previously, resulted in allowing the plant to be built without the installation of steam generating equipment, or a large electrical substation. Electrical power is purchased from the Southern Pine Lumber Company's lumber mill. Steam is also delivered to the treating plant from the lumber mill through a line 3600 ft long. This not only saved original investment but results in large operating savings since no more manpower is required to operate boilers



The chemical storage area has five tanks, two of which are creosote working tanks and one pentachlorophenol working tank. Tanks are connected by piping to the treating cylinders and pumps. Treating fluid is drawn from working tanks by pumps and pumped into the cylinder. When process is completed, treating fluid is pumped back into the working tank from the cylinder. The difference in elevation of the fluid in the tank, as indicated on remote reading monometers in the treating building, gives direct reading of the amount of treating fluid retained by the charge of treated material.

Treating building and cylinders, showing vacuum jets, area lighting, power distribution and steam line. Located inside the treating building are transfer and fill pumps, an Ingersoll-Rand air compressor with 100 hp motor, instrument panel with gauges giving direct readings of temperature, pressure, flow, etc., for the process, laboratory for checking treating fluid analysis, and miscellaneous piping and valving to and from the treating cylinders.



and electrical gear. These items are perhaps the best examples of what can be achieved as a result of overall planning when additions are being planned to a manufacturing facility.

Future Expansion

Consistent with all well-engineered facilities, Southern Pine's Treating Plant was designed with provision for future expansion at a minimum of cost and interference with operations. The treating cylinders are so arranged with the treating building that additional cylinders can be installed along the line of treating cylinders and can be connected to the necessary pumps and working tanks without interfering with operation of the existing cylinders. Expansion of existing cylinders can be accomplished even more readily by extending the length of the existing cylinders if and when the market justifies this increase in capacity.

Raw materials for this treating plant are to be drawn from the company's own timber lands and through working agreements with adjoining lumber companies. This constant and assured supply of treating material gives this modern treating plant a considerable edge over other plants which depend on open market buying of raw material.

Mr. J. U. Foster is manager of the treating division, and Mr. C. F. Lord is superintendent of the treating plant.

The original estimate both of plant construction and of the operating cost and profits to be obtained have been accurate within a few

per cent, based upon operating data obtained thus far. Since the plant has been placed in operation, production has been increased almost at once to maximum capacity and production has not been able to meet the demands. Contracts con-

sume most of the plant's treated lumber output for the next 2 years. The present plant was put into operation with a very small amount of trouble shooting and successful operation seems assured at this time.

Improved Water Supply at Roanoke Mills

(Continued from Page 75)

4-in. meter and by-pass line were installed to supply water to the 6-in. main at a point beyond the connection of the dye house line. A shut-off valve was installed between these two connections. The new piping was installed by S. S. Smith, mill master mechanic, and his maintenance force.

Results

As a result of installing the new system, water for the beam dye machines travels through an average of 450 ft of piping instead of 645 ft as in the old system. Water for the raw stock machines travels an average of 370 ft through the piping instead of 685 ft as in the old system. In all cases water is supplied through larger lines or the volume of flow in existing lines is reduced by splitting the system at the water softeners. The total quantity of water consumed is not materially increased as the volume required per dyeing cycle remains the same.

The changes in the water system represent an investment by the mill of \$3,000 for which we have real-

ized an annual savings of \$25,000 or a return on our investment of over 800 per cent. No additional new dye equipment was necessary. These savings were made possible by increased production, elimination of overtime, and better control of water during the dyeing cycles. Two raw stock machines can now be washed simultaneously and with improved results. Delay time for the beam dye kiers has been reduced from twenty minutes to five minutes per beam.

We did not believe that such savings were possible until we were forced to face the situation. Don't assume that your own water supply system cannot do the same for you. Check and double check the main water supply lines. We hope you will be as agreeably surprised as we were with the possible savings.

Editor's Note:

This article showing how a \$3000 investment resulted in \$25,000 annual savings is a typical illustration of the thoughts expressed in our editorial on page 77 of the October issue. Small investments can pay big dividends.

Blow Down Valves

HOW to Use and HOW NOT to Use Them



Here is one type of a number of standard blow down valves that will give satisfactory service.

By HARRY M. SPRING, JR.

The blow off connection is located at the lowest part of a boiler to remove sludge and scale. Failure to remove it may cause serious damage.

PARAGRAPH 308 of the A. S. M. E. Code for Power Boilers requires that each boiler have a bottom blow off pipe equipped with

Overheating and bulging of tubes caused by steam blanketing.



a valve of a type that does not have a dam or pocket against which sediment can accumulate. Globe valves of the conventional type should not be used. Not only does the reverse turn through the valve permit a pocket of sediment but the valve set would not stay tight long. They would be cut by bits of scale.

There are available a number of types of standard blow down valves that give excellent service.

Proper Operation

Except with traction or portable boilers, two blow down valves are required on each blow off connection where the pressure exceeds 100 psi. At least one of the valves should be a slow opening valve, which means at least five 360 deg turns of the valve wheel between full open and closed positions. Frequently one of the valves is a quick opening lever operated disk type valve. It is customary to locate the quick opening valve between the boiler and the slow opening valve.

With such a combination, the proper way to open the blow down valve is as follows:

- (1) Open slowly the quick opening valve.
- (2) Open slowly the slow opening valve.

Never leave a boiler with the blow down valves open. If necessary to walk to the front to see the water level, close the valve first. Many boilers have been seriously damaged by failure to observe this rule.

To close this pair of blow down valves:

- (1) Close slowly the slow opening valve.
- (2) Close slowly the quick opening valve.

By studying the above procedures, it will be seen that the valve on the down stream side is the one that actually starts and stops the flow. With the down stream valve taking the beating from scale and sediment particles, it will be the first one to be cut and tend to leak.

However, there will be a tight, unworn valve between it and the boiler thus permitting repairs to the worn valve without removing the boiler from service.

A further advantage of operating a quick and a slow opening blow down valve as described is that the flow is never started or stopped with the quick opening valve which unthinkingly might be operated just a little too quickly. If such should occur, the sudden surge or sudden stopping of high velocity flow would result in water hammer, which causes a severe shock that might rupture the piping or fittings.

Time Factor

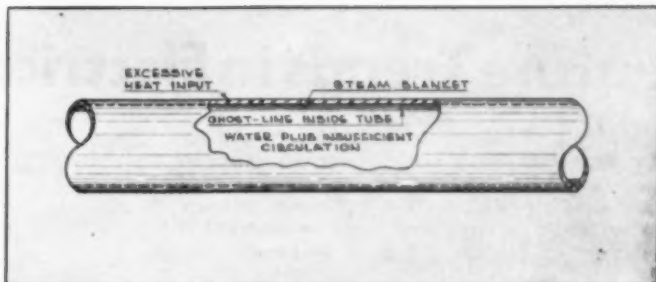
The time of blowing down a boiler is of much importance. The blow off connection is located at the lowest part of a boiler so as to remove sludge and loose scale falling to the bottom. Failure to remove it might cause overheating and damage. The best time to blow down a boiler is after it has been standing under banked fire conditions. Once the boiler is fired up, circulation causes much sediment to be picked up and go back into solution.

It is not always possible to have the boiler under banked fire conditions; then it is best to blow down when the load is low. Blowing down a water wall header with the boiler operating at high ratings may rob supply water to water wall tubes and cause starvation or steam blanketing. Overheating and bulging of the tubes will surely result.

Purpose of Blow Down

There is a fallacy in the minds of some that blowing down a boiler controls scale formation. This may be true to a limited extent but the main purpose is to replenish a portion of the boiler water with fresh make-up water to replace that blown off and to prevent the build up of a high concentration of solids. If the concentration of solids in the boiler water becomes too high, increased surface tension prevents free release of steam bubbles. A film of water may surround each

A continuous blow down system aids a great deal as a supplement to the required blow off systems in the control of concentration.

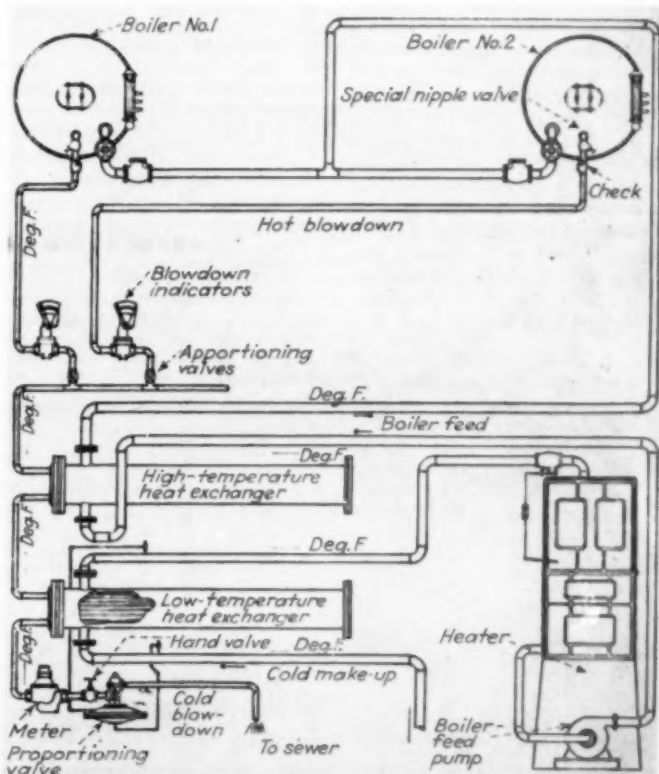


Blowing down a water wall header with the boiler operating at high ratings may rob supply water to water wall tubes and cause starvation or steam blanketing. Overheating and bulging of tubes will result.

steam bubble resulting in froth or foam. It becomes difficult to determine the water level in the glass. The moisture encased steam bubbles carry over appreciable moisture and dirt into the steam line. Excessive wear of valves, engines, turbines, and other steam driven equipment may result.

A continuous blow down system aids a great deal as a supplement

to the required blow off systems in the control of concentration. A heat exchanger may be employed to recover practically all waste heat which is absorbed by incoming cold make-up water. The continuous blow down system is not designed to reduce abnormally high water level in case of emergency. That is another purpose of the required blow off lines.



Future Trends in Electrical Equipment

EQUIPMENT must be made available through the cooperation of both manufacturer and user to be ready to do an economical job commensurate with good operating practices. With this general principle in mind, we will review some recent developments in equipment and some predictions for the future.

Presented to the
Southeastern Electric Exchange
Richmond, Virginia, October 4, 1951

By **A. A. JOHNSON**
Westinghouse Electric Corp.

Prime Movers

(a) **Steam Turbines**—Metals have been improved over the years and practical steam temperatures have reached 1100 F as illustrated on Fig. 2. At 2400 psi this temperature will give about 8½ per cent increase in efficiency over 1250 psi and 950 F. The next step to 1150 F at high pressure is now being studied and will come only after the 1100 F material is proven and the metallurgist has produced a suitable new material.

Fig. 2 also shows the increase in steam pressure over the years. In the next ten years steam pressures will probably reach 3000 psi.

The use of a single stage of reheat back to the initial throttle temperature allows a gain of about 4½ per cent in efficiency. Many recent turbines have reheat and I believe this trend will continue. In fact it is entirely possible that a second stage of reheat may be used with an additional gain of about 2 per cent in efficiency provided it is economically feasible.

A future possibility is that geared turbines may be used with

several small high-temperature turbine wheels operating in parallel at speeds higher than 3600 rpm. but with the generator at 3600 rpm. It may be that such high-speed turbines will have expendable blades with a complete spindle fully bladed for replacement on a regular maintenance basis.

(b) **Gas Turbines**—the gain in thermal efficiency for steam turbines with increasing temperatures and pressures plus reheat is definitely approaching a saturation point. The gas turbine, on the other hand, shows about three times the incremental gain in thermal efficiency with increasing temperatures. The gas turbine is a relatively new type of prime mover which today stands about where the steam turbine stood 40 or 50 years ago. Its most efficient operation, and in fact its future development depends upon the availability of suitable materials for high temperature operation. Today materials are available for temperatures of 1500 F because the pressures are not high and the parts are small. Higher tem-

perature materials are desirable in order to obtain the higher efficiencies.

We have on order a 15,000 kw gas turbine. It will be a form of open cycle turbine. The closed cycle offers possibilities of gas turbines maybe more than 50,000 kw. There are now several gas turbines in industrial and utility plants ranging up to 5000 kw. A number more are on order. Undoubtedly the gas turbine will develop at an accelerated rate during the next few years, but I do not believe it will be a big factor in supplying power for electric utility systems for a long time to come. Its development will depend to a considerable degree on the technological developments for aircraft jet engines.

(c) **Atomic Power**—The nuclear physicist tells us there appears to be no possibility that electric power can be converted directly from fissionable materials. In other words, to obtain electric power from atomic power we must go through a heat exchanger, then probably to a steam turbine and

Fig. 1. Horsepower of equipment available to each worker

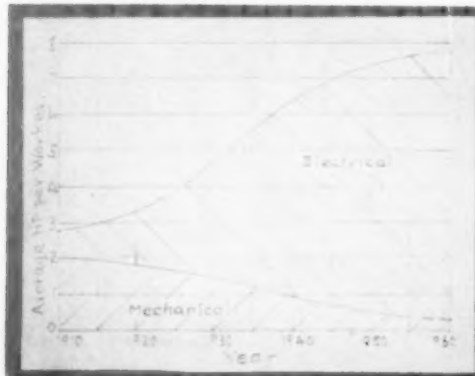
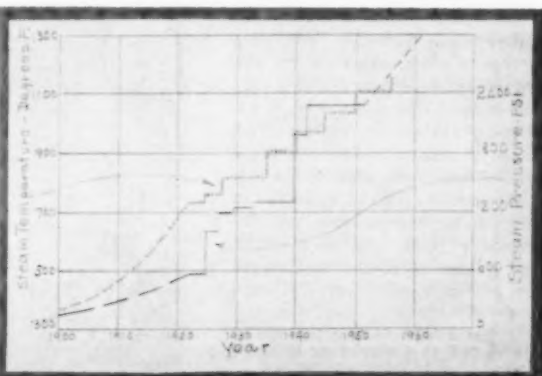



Fig. 2. Trends in steam temperature and pressure



One of a series of case histories from
the records of Hall Laboratories, Inc.

THE CASE OF THE CORRODED CYLINDER LINERS AND THE "REMOTE CONTROL" APPLICATIONS



Less than 300 kilometers from Caracas, Venezuela, is a growing town of 125,000, where Diesel engines provide the major source of electric power. This installation contains closed water systems for engine jacket cooling, which exchange heat to open, circulating cooling systems utilizing conventional wooden towers.

With rapidly growing power demands, water-related problems reached an acute stage. On the water side of the cylinder liners, severe corrosion evidenced itself as partial graphitization. Heavy scale formed rapidly in heat exchangers. Water storage tanks were fouled with organic growths. Plant efficiency became markedly impaired.

Fortunately, a Hall engineer had just made a survey of the entire water system. So, the Plant Superintendent arranged immediately to follow the advice of Hall Laboratories.

For the open system Hall recommended the use of Calgon and algicide with proper control of pH and blowdown. For the closed engine jacket system chromate and wetting agent were specified with control of pH.

The Plant Superintendent made tests, kept logs, and sent samples and reports to Hall via air mail. This splendid "remote control" cooperation between the superintendent and his staff and Hall Laboratories now makes possible such reports as "The liners of No. 1 Engine pulled. No evidence of corrosion" and "No need to clean heat exchangers this month."

Now, new engines and cooling systems are going in and they will be properly protected from the ravages of scale and corrosion, right from the start.

This is another example of how Hall Laboratories serves industry wherever water problems occur. Years of experience with industrial water problems prepare Hall Engineers to help you solve yours. For information, write to Hall Laboratories, Hagan Building, Pittsburgh 30, Pa.



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NEW

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INSTRUMENT VALVES

**For Orifice Meters, Regulators,
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HERE'S A NEW DESIGN in instrument valves — forged steel for strength in high temperature or high pressure service; no bonnet joint, swing bolted gland for easy packing adjustment.

Compact enough to fit the limited spaces of panel boards, this new Edward instrument valve is especially designed for close regulation on meter and regulator lines, too.



Built in globe or angle design, screwed or socket welding ends, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 in. sizes. Working pressure ratings 6000 lb WOG, 1500 lb at 850 F with carbon steel bodies, and 1500 lb at 1000 F with 13 per cent chromium EV alloy stainless steel bodies. Write today for Bulletin 491.

ACTUAL VALVE SIZE ►



**FIG. 952
SERIES**

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Please send me Bulletin 491 — on Fig. 952B & 2952 Series

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Company _____

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City _____

Zone _____

State _____

Another  Product

Edward Valves, Inc.

Subsidiary of **ROCKWELL MANUFACTURING COMPANY**
EAST CHICAGO, INDIANA



electric generator similar to those now in service.

Early this year *Life* magazine had a very elaborate layout of a large steam generating plant supplied from an atomic pile. It consisted of nine 160,000 kw generators with a very small boiler as compared to present steam plants. Whether this layout is fantastic or practical will probably take many years to determine. In my opinion fissionable material will be used primarily for national defense purposes for a long time. In the meantime, the techniques of operating a power plant from atomic power will be studied carefully and continuously perfected perhaps through the use of an experimental plant.

(d) Water Wheels—Various types of water wheels are in use and improvements in metals and wheel shapes are still being made. However, the same basic designs appear to be destined for all future applications.

(e) Solar Collectors—Since solar energy manifests itself as low temperature heat, it must be concentrated by lenses and mirrors to make it useful. The concentrated energy is then transferred to water or water vapor for use. By optical means it is possible to concentrate sunlight about 50,000 times, and this may make possible very high temperature furnaces. It has been reported that Russia has solar boilers operating to drive textile plants at 30 psi at 170 C, with superheated steam at 470 C reported in one installation. A solar plant having about 16 per cent thermal efficiency can probably produce electricity at a cost of about 0.5 cent per kilowatt-hour. The chief element of cost would be the very high capital charge due to the size of the installation. To supply the United States energy requirements, a plant of this design would occupy an area of 25,000 square miles. This is a fantastic figure, but the power output is also fantastic. Solar energy may be a source of power in the future.

(f) Other Possible Sources of Power—It is possible to develop equipment to obtain electric power

More Need ... More Power ... More Equipment

INSTALLED generating capacity in this country increased from about 13 million kilowatts to 75 million kilowatts from 1920 to 1951. In the same time the generated kilowatt-hours increased from 40 to 360 billion. By 1961, it is expected that the installed generating capacity will reach 140 million kilowatts, and the annual rate of generation at over 600 billion kilowatt-hours. Thus in about ten years the amount of equipment for the generation, transmission and utilization of electricity will almost double.

There is about 5 kva of transformer capacity for each kilowatt of generator capacity, or approximately 375 million kva of transformer capacity in service. There is an equally large proportion of other heavy electrical equipment such as circuit breakers, not to mention the thousands of smaller but essential pieces of apparatus and devices. It is believed that electrical utilization devices including both industrial and domestic is at least three times the installed generating capacity or a total of 225 million kva.

Doubling the generating and utilization equipment in ten years undoubtedly means an increase in investment equal to that which is now invested. This appears to be a super-human task, and it is. This job, however, must be done to supply the ever increasing demands for electric power brought about by:

1. Public recognition and appreciation of the benefits derived from increased use of electricity
2. Population growth
3. National defense or preparedness effort
4. Arming of other nations in many parts of the world
5. Continued business as usual at home.
6. Supplying food products to other nations who are in dire need

This country has developed the greatest industrial machine ever achieved and our people look to the electrical industry for power in larger quantities to carry out this tremendous program.

The electrical industry backs up the average American industrial worker with between 7 and 8 horsepower of equipment to carry on his daily work. How this developed is indicated on Fig. 1.

from wind, heat pumps, tropical waters, earth heat, tides, and atmospheric electricity. All of these possible sources of power have been used so far mostly in experimental investigations. It may be that in years to come one or more of these forms of energy sources will be developed, particularly as the availability of fossil fuels (coal, oil, gas) is reduced and their cost increases.

Generators

(a) Turbine Generators—The 3600 rpm generator has almost completely replaced turbine generators operating at lower speeds. The large 3600 rpm units weigh about 60 per cent of a similar rating at 1800 rpm. Today Westinghouse has a number of 3600 rpm generators of 150,000 kw capacity and at least one of 200,000 kw capacity on order. The larger generator units are being applied to power systems for the following basic reasons:

1. As the load grows on each system, the maximum size unit which can be applied economically grows with it.
2. Larger units cost less and take less area and volume per kilowatt of installed capacity.
3. Emergency conditions can be covered by area reserves through transmission line interconnections to neighboring systems.
4. Under national emergency conditions, larger units will be favored because they take less material and manpower per kilowatt.

The maximum rating of 3600 rpm turbine generators has doubled since World War II. It is predicted that 250,000 kw machines will be available within the next few years, and possibly 300,000 kw machines within the next ten years. The larger rated units of the future will have still less weight per kilowatt of capac-

ity, and very probably will either operate at higher temperatures or have different types of cooling systems. Notable among recent achievements in generator construction are the following:

1. Improved insulating materials.
2. Better forgings for generator rotors and also better methods of determining whether they are of good quality.
3. More effective cooling methods. We are presently using 30 psi hydrogen pressure in a few generators with some consideration of using higher pressures.
4. Because of better insulating materials, higher generator voltages are being used. 18 kv is quite common and for the larger machines voltages as high as 27 kv are being discussed.
5. Higher field voltages. 375 volts are now used for the large size generators and this could possibly be increased.
6. Advanced design techniques. This covers such factors as better bracing of the windings in the stator and rotor, better ventilation for each of the windings, improved terminal bushings, etc.

(b) Waterwheel Generators—Hydro generation in the United States now stands at about 19 million kilowatts. Generator ratings vary in size from a few kilowatts to 108,000 kw. We see no basis for changes in this type of generator because their size and characteristics are dictated for the most part by the water conditions and the type of waterwheel used. Improvements in the component parts of these generators, however, will take place. For one thing, Thermalastic insulation will be used on these machines in the near future. Bearings have been improved by more refined manufacturing facilities. The rotor spiders today are, for the most part, fabricated steel rather than cast.

It may surprise you to hear that there are over 50 million kilowatts of hydro power yet undeveloped in the United States. Probably about

10 million of this will be done in the next ten years mostly by public agencies.

(c) Induction Generators—There are several small hydroelectric plants employing induction generators using shunt capacitors on their terminals where necessary to provide excitation. We recently sold twelve 1200-kw induction generators for an automatic hydro station which will be connected to a large power system. Because of the rugged nature of an induction machine, it is believed that a number more such remote-controlled automatic installations will be made, particularly in the smaller ratings up to say 3000 kw. The cost of such equipment makes for economical generation of kilowatt-hours.

Transformers

(a) Power Transformers—The trend in power transformer design is towards greater efficiency, less weight, better insulation, and better cooling. We believe that the form-fit transformer, which can be operated either in a vertical position or on its side, represents a trend because of the very large kva which can be manufactured and shipped as a single unit. We are now building several 190,000 kva, 3 phase, water-cooled transformers for 138 kv service to be shipped in one piece. Even larger rated units are very imminent. The limitation is determined by shipping requirements.

For power transformers the trend is definitely to three phase units. Single phase transformers for very large banks must be used where the physical size (as a three-phase unit) exceeds shipping dimensions.

For the large high-voltage power transformers the trend is to forced oil cooling. We believe this trend will continue in liquid filled transformers until gas filled transformers replace them.

Another very definite trend in the design of transformers for 115 kv and above is to use minimum insulation levels on solidly grounded systems in such a way that the transformer insulation can be protected by modern-type

lightning arresters. For example, 825 kv basic impulse insulation level for 230-kv applications can be protected and is being applied instead of 900 kv or 1050 kv as in past applications. Considerable savings result from applying reduced insulation.

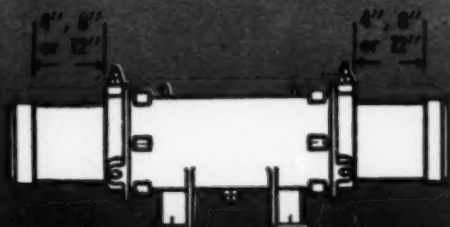
(b) Air Cooled Transformers—There has been a tremendous increase in the acceptance and use of dry-type air-cooled transformers on voltage 15 kv and less. The present trend is that this type of transformer is being applied in buildings and industrial plants instead of units with any type of liquid cooling. This trend will continue.

The dry-type air-cooled transformer is also being manufactured completely sealed in a tank with inert gas. This unit has use in network and industrial applications where water (or moisture) and contaminating atmospheres are a problem. It is believed this type of transformer will be used more extensively as experience is gained and ways are found to reduce its cost. This job, however, may be taken over by vapor-cooled transformers mentioned below.

(c) Distribution Transformers—This class of transformer has reached a high state of development. Various techniques have been adopted to reduce cost and at the same time improve quality. The CSP type of distribution transformer now accounts for about 60 per cent of the total number of units manufactured. The banked secondary units are increasing in popularity, and I believe this trend will continue. It is also expected that the semi-buried type of application of distribution transformers will increase.

(d) Vapor-Cooled Transformers—A vapor cooled, vapor insulated transformer that is expected to be $\frac{1}{4}$ to $\frac{1}{3}$ lighter than liquid-immersed transformers has just been announced by Westinghouse. It is expected that voltage ratings of such transformers can be extended far beyond the present 15 kv ceiling for dry-type transformers. Heat transfer is far superior to that with circulating oil;

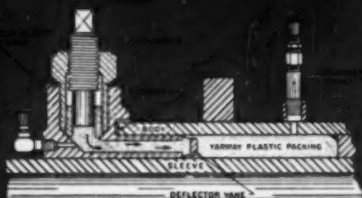
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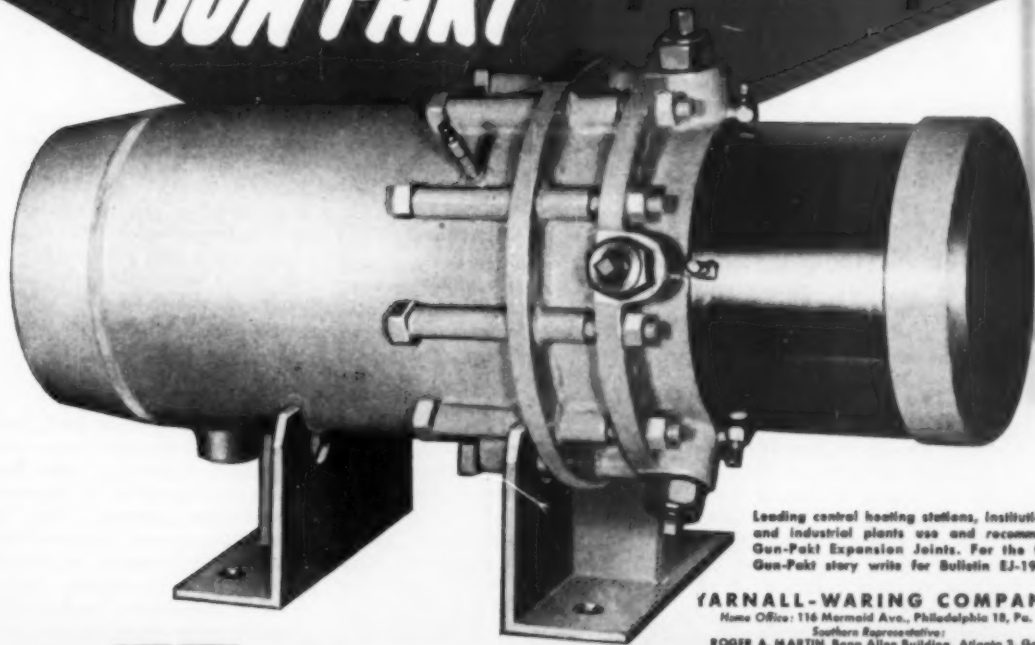
For example, one single-end Yarrow Gun-Pakt joint with an 8" traverse is all that is needed for a 200 ft. run of steel pipe carrying saturated steam at 250 psi.

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therefore, a more compact coil assembly can be made and the external cooling surface reduced. A schematic of the system is shown in Fig. 3. This transformer, however, is still in the development stage.

Switchgear

(a) **Oil Circuit Breakers**—A relatively recent development in large circuit breakers is to design the tank with a tear drop shape requiring about 40 per cent less oil. This design is applicable to breakers for 230-kv operation and above. Such breakers have interrupting capacities as high as 10 million kva and remove faults in three cycles or less. A rating of 15 million kva is now under consideration for 230 kv or higher voltage, while circuit breakers with conventional cylindrical tanks are being built for voltages down to and including 138 kv of 10,000,000 kva interrupting capacity.

The switchgear manufacturing industry can produce and adequately test apparatus to handle whatever concentrations of short circuit kva are required on any existing or proposed system. It appears that more high capacity breakers will be used in the future because in many cases it is more economical to tie more equipment together than it is to build more transmission lines to keep them separated and thus limit concentrations of short-circuit kva.

(b) **Air Circuit Breakers**—There is an increase in the number of air circuit breakers for voltages up to 34.5 kv. Some have been manufactured and installed for 69 kv. These breakers are either indoors or in weather-proof housings, and I believe this trend will continue. Few, if any, liquid-filled breakers will be used indoors or in unit substations.

Several outdoor 69 kv and 138 kv air circuit breakers have been manufactured and applied in this country with results which have been very discouraging. Higher voltage air circuit breakers have been manufactured and applied in other countries. It appears to be very difficult to manufacture and keep in service large

amounts of porcelain applied as it must be in high-voltage, high interrupting duty air breakers. It is questionable, therefore if high-voltage air circuit breakers will attain a favored spot on the power systems in the United States in the near future. I believe this is particularly true because modern high voltage oil circuit breakers have been giving excellent performance before and since the interrupting demands increased to high values.

Series Capacitors

It is believed that series capacitors will be used in high voltage lines in the future for several reasons. They will increase the power transfer of a given transmission line, they will help increase system stability and can be used in paralleled transmission circuits to provide better load division. It is probable that in some cases the maximum voltage selected for new construction will be limited because series capacitors can be used. Series capacitors also may be installed in existing lines to defer rebuilding at a higher voltage.

We have built and installed two large series capacitors; one 10,000 kva in a 66 kv transmission line, and one about 20,000 kva in a 220 kv transmission line. Two more are being manufactured for 220 kv operation, one with about 40,000 kva and the other about 80,000 kva. The same type of units are used for series capacitors as are used for shunt capacitors. The technique of protecting series capacitors in high voltage circuits has been developed so that the series capacitor can be reinserted into a transmission line at the first current zero after a fault is cleared. I believe that more large series capacitors in high voltage circuits will be installed during the next few years.

Fault Clearing

High speed relays and high speed circuit breakers have contributed more than any other factors to the stability of interconnected power systems. Today the best high voltage transmission line relays will operate in 1 and 3 cycles with the fastest circuit breaker guaranteed for 3 cycles. Various types of relays are now

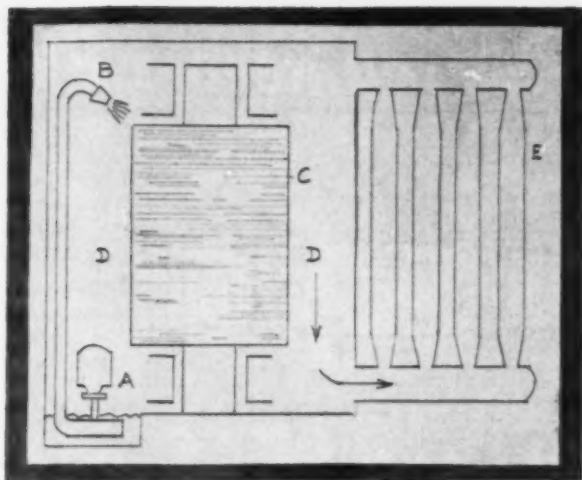


Fig. 3. How Vaporization Cooling Works

A small pump (A) forces liquid fluorocarbon to spray nozzle (B). The liquid evaporates (C), taking its latent heat of vaporization from the coils. The vapor fills the tank (D), insulating the transformer parts. The vapor is forced upward through the cooling tubes (E), and as it condenses the condensate flows by gravity back to the pump. Condensation is accompanied by a small change in the temperature and the temperature of the cooling surfaces is only a few degrees Centigrade lower than that of the coils.

being considered for faster operation throughout the whole application range of voltages and types of circuits. I believe there is a definite trend to reduce relay and circuit breaker operating times to give better system stability and minimize disturbances. Carrier and microwave channels for faster relay operation will increase in number on new as well as old circuits.

Standardization of Equipment

To produce and apply the equipment required to double the electrical facilities in the next ten years means that standardization will be of primary importance. There is a stronger trend than ever before towards standardization of all kinds of equipment and methods. Fewer engineers will insist on their own personal way of designing equipment. A major reason for this is that non-standard equipment is an economic luxury which fewer organizations can afford.

Packaged Units

Another definite trend is that of packaged units for electrical equipment. They are particularly advantageous whenever a unit can be assembled, tested, and shipped in one piece. Such things as unit substations, unitized switchgear cubicles, control panels, transformer units, and turbine generators are shipped for direct placement on the foundation. Packaged units will become more popular in the future as more users are convinced of their economic feasibility.

Electric utility companies must have engineers just like they must have equipment. The picture for the next few years is bad. According to the best authorities, by 1954 we will have a cumulative shortage of over 40,000 engineering graduates. Some industrial and utility companies are sponsoring scholarships and other forms of assistance to worthy young men who are financially embarrassed. I suggest that each utility company view this problem seriously and do something about it in a tangible way.

By 1956 it is expected that the

electrical graduates will drop to about 5000. It is obvious how this is going to affect an industry which has such a tremendous expansion program ahead of it.

The technical manpower problem is even more serious than the immediate needs of any one company or organization. It is serious because from now on we are going to live in this complicated world on how much we know and what brains we can develop. Our ability must be used to develop new know how, better techniques, new and better equipment for industrial, domestic, and defense equipment.

Summary

Phenomenal developments take place practically every day, but the greatest bulk of our efforts is on improving component parts of our equipment and systems. Through these improvements the industry is continuously making available for effective work just a little larger percentage of the basic energy source.

The following trends are significant for future electrical

equipment:

1. Equipment will have less weight per unit of rating.
2. Equipment will be more efficient.
3. Generator ratings will increase to perhaps 300,000 kw in ten years.
4. Gas turbines will be more highly developed, but will not be a major power source in ten years.
5. Atomic power will be developed, but will be used almost entirely for defense purposes for a long time.
6. Vapor cooling of transformers will be perfected.
7. Interrupting capacities for circuit breakers for 15,000-000 kva will appear.
8. Higher speed relays will be used.
9. Series capacitors will be applied in more high-voltage transmission lines.
10. Standardization will become more general on all types of equipment.

Orlando Utilities' 25,000th Meter

ORLANDO Utilities Commission officials see the panel commemorating the installation of the 25,000th electric meter in Orlando.

In the usual order are Clarence Johnson, member of the commission;

J. H. DeVane, superintendent of electric distribution; C. H. Stanton, general manager of the Orlando Utilities; and W. A. Hutchinson, president of the commission. Note the 1923 model as compared to the G-E 1951 meter.



Advantages of

Portable Compressed Air Power in Engineering and Construction

Versatility of compressed air and portability of compressors play important role in building efficient industrial plants at minimum cost.

data and illustrations courtesy
Compressed Air and Gas Institute

ONE of this country's leading builders of refineries, chemical plants, and power plants has carefully studied methods of providing power for the many types of tools and equipment used in the field of construction. The principal requirements are mobility, ease of setting up the power source, and its effectiveness on the work to be done. The company has virtually standardized on compressed air-operated tools and equipment.

Portable air compressors provide mobility. They can be transported to any area and moved onto the job site more easily than other types, especially so with the modern design adopted by the portable compressor manufacturers to provide more compact units than ever before.

Portable air compressors may be set up faster and more economically than other types of power units. And once in operation, the power is produced economically because the ratio of compressed air to engine power is high.

The versatility of compressed air enables the engineering firm to use this power for over 80 per cent of its operations, and thus eliminates need for setting up other power sources except for lighting.

Portable air compressors at the yards of the company's headquarters include six units of 105 cfm capacity, 12 of 210 cfm capacity, and six of 315 cfm capacity. The

number of units and their range in size enables the contractor to operate economical combinations of compressors in accord with the size and progress of the construction projects.

The economies of moving, setting up and operating a power source on the job would soon be wiped out if the performance of the tools and equipment were not also efficient. The company's description of its uses for tools and equipment commonly used in construction shows that its power source meets the requirements in this respect.

Examples

Air hoists, (Fig. 1), were cited as one example of the benefits gained. One project may use up to 20 such hoists at a time. Parts or materials weighing up to one ton are easily handled and with exact control. Special operators are not required because there is no gear ratio problem or other complication to be concerned about. There's just a lever to hold. The fact that the air hoists stand out in all kinds of weather with virtually no servicing or part replacements required also adds to their economy and dependability.

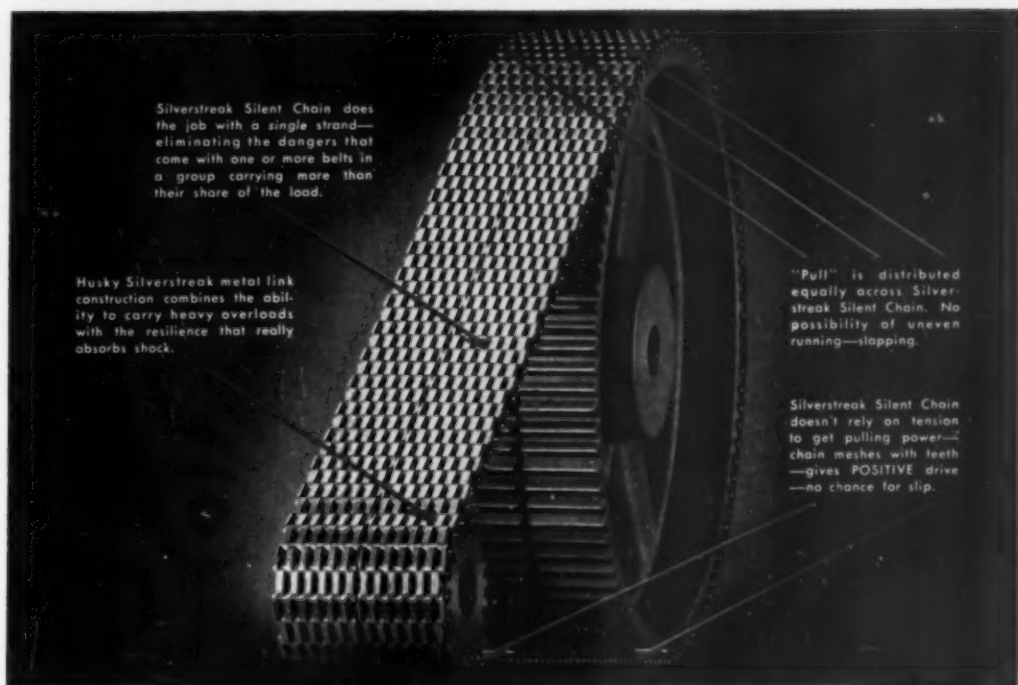
The scant need for servicing and parts replacement has proved especially important to operations distant from supply centers because large replacement stocks do not have to be carried on the job site.

In the case of pneumatic tools, for example, regular lubrication is the chief attention given. Their oil reservoirs are filled once or twice a day and if chippers or riveters are to be taken out of service for a week or more, they are submerged in a bath composed of kerosene and light oil in equal parts. A small quantity of light oil is placed in the air inlet before operating again. This routine procedure adds greatly to the long life of pneumatic tools and helps to keep them at full efficiency.

Pneumatic tools in general use by the construction crews include grinders, (Fig. 5), rivet guns, paving breakers, (Fig. 4), impact wrenches, (Fig. 2), chipping hammers, (Fig. 6), and similar tools. Standardization in sizes and types of tools is considered advisable by the construction firm because workers become more familiar and adept with them that way. Impact wrenches, which are used because of their fast and positive action in pulling down bolts, have been standardized in three sizes, ranging from those for bolts of $\frac{3}{4}$ -in. up to $2\frac{1}{2}$ -in. Special sizes are used only when special conditions warrant. The same policy is followed in connection with other such tools.

Productivity and safety of the worker are of prime importance in any construction work. After choosing the right tool for the particular work to be done, and this careful selection in itself can make a great difference in productivity, it is found that the worker is more adept with pneumatic tools on the heavier work because the tools weigh less than other types of similar capacity. The same factor of light weight reduces worker fatigue and increases productivity. Ease of handling tools in precarious positions and reduction of fatigue are

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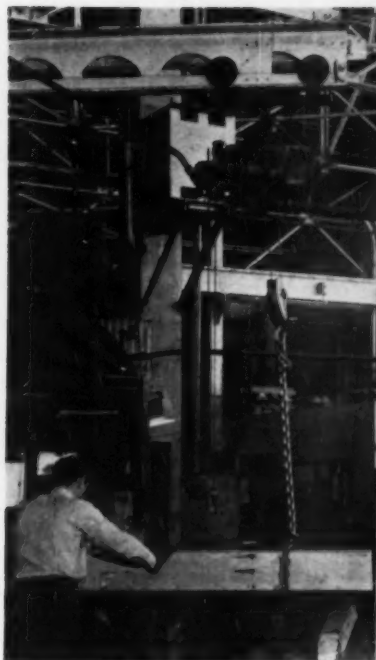


Fig. 1. Air hoists lift forge stock to sawtable with ease and precise control. Similar equipment has many other uses throughout the plant.



Fig. 2. Impact wrenches are used to tighten and take off heavy nuts. This one has just pulled a 1-in. bolt in two, when the threads failed to loosen.



Fig. 3. Paving breaker with sheeting driver front head. The machine saves much time over hand methods and does not "broom" the boards.

Fig. 4. Breaking bed rock in process of excavation by means of paving breaker.



Fig. 5. A compressed air-operated grinder being applied to a steel casting.





Fig. 6. The 66-in. block sheave shown here is being chipped with a pneumatic chipping hammer.



Fig. 7. This light weight sump pump operates completely submerged. One man can place the unit.

important considerations in preventing accidents.

Application

All of these benefits may be further illustrated by citing examples of the pneumatic tools in use. Grinding tools are used for cleaning welds, wire brushing mill scale before painting, and in a number of other instances. Because the air tools are light in weight, jobs which might otherwise be heavy for one man become easy with pneumatic grinders.

Impact wrenches might be taken as another example. These pneumatic tools not only spin down bolts fast and surely, but they also do it with ease for the worker. In addition to the light weight, such as noted in the case of pneumatic grinders, the impact wrenches absorb the torque instead of the worker. As a result, he does many jobs with one hand and with ease, he is not fighting the tool, he is not straining in precarious positions where a slip might mean an accident and he does not become tired quickly. He is safe and more productive.

The construction firm must have compressed air regardless of other considerations for paving breakers, chipping hammers, riveters, pile

drivers, (Fig. 3), and other reciprocating tools. There is no other practical choice here. However, it is the fact that compressed air-operated equipment has also proved desirable where there is a choice, that has enabled the construction firm to standardize on this power.

Sump pumps, (Fig. 7), were mentioned by the company as an

illustration of this versatility of compressed air in efficient application. Pneumatic sump pumps, operating off the same air compressor as the other equipment, are just thrown into the slush and let run. This could not be done with other types of pumps. Again, instead of having a man to watch and operate the pumps, as might be required with other types, one air compressor operator can easily keep an eye on 20 or 30 pumps as well as on the compressors.

Another interesting example of standardization is noted in connection with the fire hose used. By using 2-in. lines, the fire hose is interchangeable with the air hose used on sump pumps. When working around marine areas, sump pumps are thrown into the salt water in event of fire and provide the fire fighters with streams of water as long as needed.

Versatility

The same air tools used out in the field may be connected to any of the outlets on the regular plant lines served by stationary air compressor systems. The contractor usually attempts to install the permanent air compressor plant of the client at an early stage of construction so that source of power may be used in completing construction.

Under-The-Roof Storage at Norge—Chattanooga

IF your plant needs more elbow room, but can't have it because of building restrictions—or sky-high building costs—take another look around for under-the-roof storage space you haven't been using.

Norge Division, Chattanooga, Tennessee, saved itself the expense of a new warehouse recently when it discovered that its Baker fork trucks could be used to lift material above office enclosures within an existing building. Now the fork truck puts material for storage up on the enclosure roof while a worker on the roof arranges it.



Flexibility in Chart Work with dry print reproducibles

By PHILIP H. KLINE

Asst. to Director of Engineering
American Enka Corp., Enka, N. C.



Typical copying machine of Ozalid, a division of General Aniline & Film Corporation. Original is placed on a sheet of Ozalid sensitized paper and fed into the machine. In a few seconds original is returned to receiving tray; copy at top of machine. Copies can be made directly from any translucent original; from opaque originals with a simple intermediate step.

ENGINEERS are familiar with the "ozalid" or dry process of "blue" printing tracings. Many uses of this process are found throughout engineering and manufacturing offices. Among them, an uncommon, but extremely useful application, is the "reproducible" or sepia transparent tracing-print which is obtainable by ordinary methods.

Such a print, obtained from an ordinary tracing, shows an exact copy of the original tracing and, being translucent, will in turn reproduce a regular print or as many as needed for report work. Further, the sepia tracing may be added-to in pencil or ink and the new data reproduced with the original copy. If the newly added data is by pencil entry, it may be easily erased and changed from time to time, yet the information that was on the

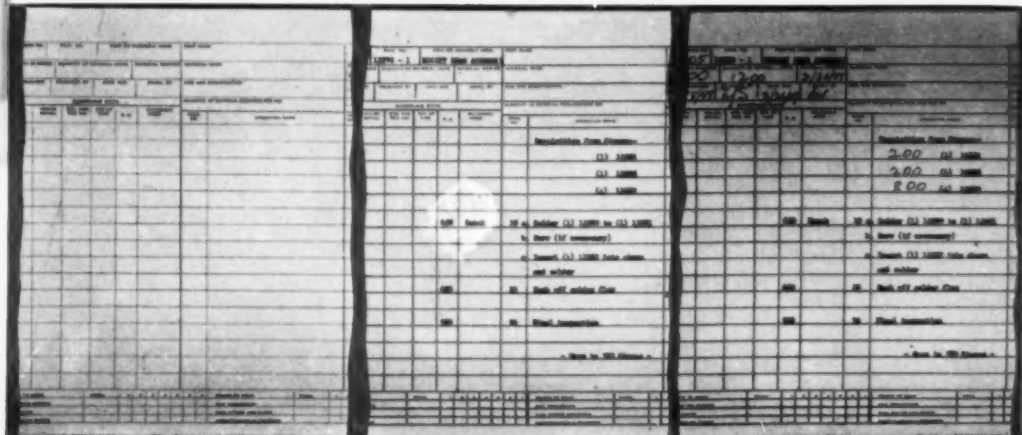
original tracing will not be changed when an ordinary print is run.

Revisions

This has considerable value in chart work, where a grid or form is of fixed intent, and it is desired to show variations of entries from time to time by partial or full revisions of the pencil-added copy. For instance, a progress chart original tracing can show the major installation items and related data. The variable information, which changes from month to month, may be drawn on the sepia print-tracing in pencil, erased and revised the next month, and when redrawn it may be re-printed to show the latest status of the chart plus the unchanged original data.

The grid or background shows no effect of the erasures, and each succeeding month's prints look ex-

Duplicate originals eliminate copying standard elements. Shown, left to right: translucent form; an intermediate with standard items added; and a duplicate original in which the variable items have been inserted in pencil



**"NO OTHER OIL
has done this Job!"**

reports

Willys-Overland Forge



Mr. Wm. Paris, Vice President in Charge of Manufacturing at Willys-Overland Motors, Inc. says, "We have saved plenty of cylinders, packing, and down-time since shifting to Sinclair lubrication."

Rising production forced the mammoth Forge Shop at Willys-Overland to set up ram speed 30%. As the power was insufficient, the steam had to be raised to 400° F. by superheating. Then the lubrication problem started!

The hotter steam and faster ram speed quickly burned up packings, and cylinders became scored. Many lubricants were tried. All failed to halt the destruction . . . until the Forge tried Sinclair Valve Oil Light. Now it reports it hardly ever has a scored cylinder and no more lubrication headaches. The Forge does not believe it possible to get finer steam cylinder lubrication and emphatically concludes that, "No other oil has done this job!"

If you have a steam cylinder lubrication problem it can pay you to consult with Sinclair, for Sinclair makes a wide variety of Steam Cylinder Oils to handle every possible need. Get in touch with your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Ave., New York 20, N. Y.



The Forge Shop at Willys-Overland, Toledo, where only Sinclair Steam Cylinder Oil has done the job.

SINCLAIR STEAM CYLINDER OILS
for every steam cylinder installation

actly like the first except for changes made. Any new data of a permanent nature may be added to the original tracing and a new sepia tracing made, which leaves other spaces blank for new pencil entries.

Where point values are plotted from time to time, in order to arrive at a representative curve, the points may be plotted on the original tracing, a sepia tracing run, and the latest curve drawn in according to the new data. A continuous record is obtained by retaining one print each of the suc-

cessive curves drawn. This type of record may be an historical one, by chronological entries made each week, or month, in which case all past history is printed with the original, together with the latest added information.

The use of such a print is readily apparent in designing or providing temporary forms. From a rough tracing, a few sepia transparent prints are made, and the forms immediately put to use without typesetting, multilith, carbons, or other time consuming preparation. The form is then filled out

on the sepia tracing and copies printed for distribution. The tracing may be used as long as need be for testing and improvements, then finally redrawn as proven best suited, in its final design. At times a temporary use will eliminate the necessity for an over-supply of regular printed forms, when only a few reports are needed. In many instances, some previously reported pencil entries may be left in, others changed, and the new report be filled out and printed with minimum postings. The printed result looks like a brand new report.

Pasco Packing Co., Dade City, Florida, describes

Power Factor Improvement

By A. LOHKAMP

Supt., Power Plant, Pasco Packing Co.

PASCO PACKING CO. of Dade City, Florida, has found that power factor improvement pays dividends in some ways not generally appreciated.

Several years ago it was found that motors were running hotter than they should and the overall plant power factor was not all that it might be. The power factor then was about 72 to 72 per cent. This wasn't bad if power factor alone were considered, but improvement could be made.

Pasco's power system involves the operation of a 1000 kw non-condensing turbo-generator, a 1500 kw condensing turbo-generator plus a tie-in with an outside source of power and a distribution system of nine circuits. Eight of the nine distribution circuits have transformers while the ninth is a 2400 volt circuit.

The connected motor load is over 6500 hp. With the lower power factor, many of these motors were drawing more current than they should and as a result, were overheating. This increase in current load reflected on the generators so that due to a high amperage on

the generator a full 1500 kw could not be generated without danger to the generator insulation. Since the generators are both old machines no chances were taken. The first capacitors installed were in the form of an automatic 180 kvar unit which cuts the capacitors in on one circuit if the voltage drops below normal and cuts out when the voltage increases to normal or above.

Further improvement was desired at other transformer banks so that another 540 kvar of General Electric Pyranol filled capacitors were purchased and installed in two banks of 180 kvar, one bank of 90 kvar and two small banks of 45 kvar. When a 700 hp wound rotor motor with a twelve point speed controller and starter was added another 90 kvar bank of capacitors was installed.

Improvement

The results of the above installation of capacitors have been very gratifying. The 1500 kw .8 pf generator has been operated at 1600 kw with an average power factor of .92 for an entire season with no

trouble. The 1000 kw machine was operated at 1100 kw a large portion of the time. Added motors on the circuits having capacitors did not require new transmission lines and motors generally ran cooler with less maintenance and less burn outs.

The savings from the installation of these capacitors have been \$1.75 per hour in operating cost, as we could generate 350 kw more on our two generators at a cost of \$.008 per kwh rather than buy this amount of current at a cost of over \$.013 per kwh. During the 240 day season which we operate this saving has amounted to over \$10,000. The installed cost of capacitors amounted to \$5400.00 so that the investment was repaid in 3076 hours or 128 days of operation.

When distribution lines become overloaded, when motors run hot and use too much current, when voltage drop is excessive, or when there is a power factor clause in the contract between the consumer and the power company, it will often pay large dividends to install capacitors. Each case must be investigated but in many instances the savings will be surprising.



Helping the MAN-IN-THE-PLANT

Difficult Insulating Problems

IT IS comparatively easy to insulate oven structures and ducting—their sides are flat. Even where ducts are cylindrical, flat insulation can easily be wrapped around the curved surfaces. But the insulation of odd-shaped heater units and recirculating blowers is quite another matter. Rotating shafts, burner flange assemblies, and odd-angle duct connections, make the shape of these units quite complex and hence difficult to insulate.

However, the exposed areas of heater units and recirculating fans are sufficient to represent considerable heat losses, and wasted fuel, if these parts are permitted to go uninsulated.

How this problem was solved by one large manufacturer may help others facing similar problems.

Three large gas-fired heater units, coupled with three large 13,000 cfm fans driven by 10-hp motors, perform the functions of heating and recirculation at three points along the oven length. Since the oven is elevated some 10 feet above the plant floor and is fed with hot gases from the top, these heater-blower units are installed upon a special platform alongside the oven, 17½ feet above floor level. The photograph shows one such unit. Note the thoroughness of the insulation despite the convolutions of surface and the confined working room.

Insulation

Basic insulating material was four-inch thick mineral wool blanket, sandwiched between one-inch chicken-wire mesh on one side and

expanded metal lath on the other, and supplied by the manufacturer in 2' x 8' pieces. This material was selected for its high insulating efficiency, its non-setting quality under the constant vibration of fan and heater operation, and its ability to be cut easily and shaped to almost any contour. Some 1132 sq ft of surface were insulated and the job was done in less than 32 hours, including application of finishing cement.

First, holes were drilled in the sheet-metal exteriors of fans, heaters and ducting. These holes were fitted with self-tapping screws which were used to affix long double tails of #16 galvanized wire to the sides of the various pieces of equipment. Mineral wool blankets were then laid temporarily over the surfaces and drawn down so that marks could be made to indicate the geometry of the cutting of the chicken wire and metal lath for purposes of shaping the mineral wool blanket in two directions.

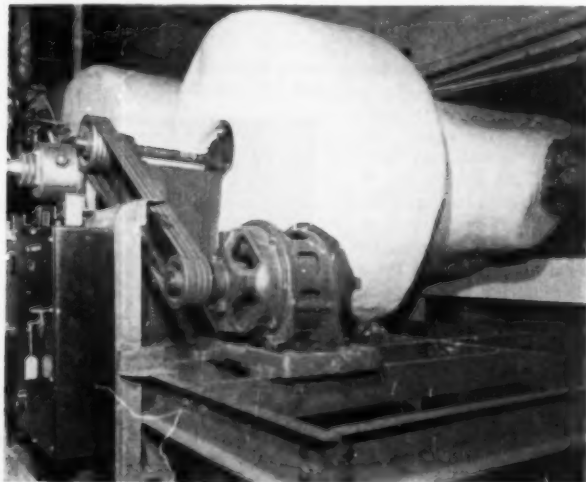
After marking, the blankets were spread out on the floor and the chicken wire snipped first. The blanket was then turned over and the metal lath cut away. Finally the blanket itself was cut. The cutting was always done so that an overlap of both chicken wire and metal lath connected cut-blanket segments. The metal lath scraps were not thrown away for they were later used in lacing exposed patches and areas of mineral wool so that the finished job had a complete envelope of metal lath for good adhesion of the finishing cements.

Every single blanket used on the job had to be cut and fitted in some way in order to custom-fit the odd shaped equipment. Their ability to lend themselves to such fitting was one reason mineral wool blankets were chosen for the job.

As the sections were installed after cutting, the galvanized tie wires were pushed through the blankets and the ends twisted together to hold them in place.

Loose scraps of mineral wool were used to fill in pie-shaped voids in the job, and scrap metal lath laced with galvanized wire was used to hold the patches in

Insulating external heaters and recirculating fans on ovens is a difficult problem. Note the thoroughness of the insulation here despite the convolutions of surface and the confined working room.



place. All corner joints of metal lath were laced as well as edged lapped.

Finishing procedure

The end result was a continuous four-inch layer of mineral wool securely retained within an intricate metal lath cage and held to the heater, blower, and ducts by wire ties. Thus, perfect resistance

to movement of the insulation under the persistent vibrations of fan and heater operation was achieved.

Over the metal lath cage containing the blanket insulation was troweled a $\frac{1}{2}$ to $\frac{3}{4}$ -inch layer of mineral wool insulating cement. After drying, this was topped with two heavy troweled coats of finishing cement to result in the smooth,

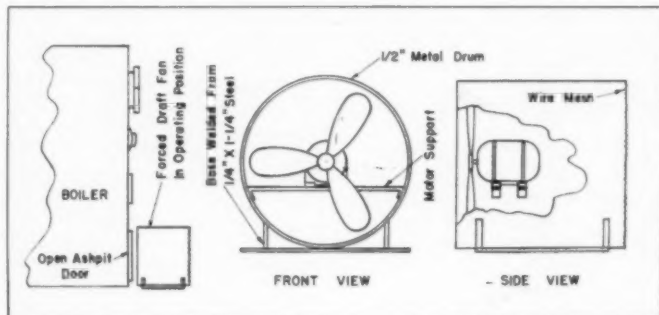
hard finish apparent in the photo.

While the areas of the heaters, recirculating fans, and connecting ducts represent only about $\frac{1}{3}$ of the total heat-radiating surface, the application of insulation is estimated to have reduced the overall heat loss by $\frac{1}{2}$ since these areas are those of highest temperatures and greatest gas-scrubbing action.

Forced Draft Fan for Hand Fired Boiler

THE accompanying illustration shows how we improvised a forced draft fan for our rather old hand fired boiler. We made it at a very small outlay of cash, and it

took us but little time. Furthermore, it works excellently and permits us to carry a higher load on our boiler. In fact, it is surprising how much this home-made fan



helps combustion. It not only allows an increased load but reduces smoke.

We took a standard 50 gal oil drum and cut off both the top and the bottom. In cutting off both ends, we left about half the length of the drum to form the casing for the fan. Across the inside of the drum we welded two pieces of $\frac{1}{4}$ x $1\frac{1}{4}$ flat mild steel, so placed that they form a support for the motor which drives the fan.

A base (also made of $\frac{1}{4}$ x $1\frac{1}{4}$ flat mild steel) was welded to the bottom of the drum. This holds the fan and its casing in position when it is placed in service. A wire mesh screen was placed across one end of the drum.

We used a 3 blade, 20-in. fan and a $\frac{1}{3}$ hp, 110 v motor.

In service, the fan is placed in front of the ash door of the boiler and then turned on as needed.—
LAWRENCE ANDREWS.

Efficiency Cabinets

JUST a step back for a man at the work bench is the neat, permanent, all metal cabinet. Formerly against that wall stood two inadequate movable lockers and two tool box benches. Not bad for looks, and other storage space some distance away had seemed sufficient for a long time. However, the mechanical maintenance man at this power house had said that too much time was being wasted in searching for things. And then he added, "Those lockers have increased efficiency around here by at least 25 per cent. Built them in spare time, too. And

most of the insides came from the scrap heap."

It is a torch-cut and electric weld job—sheet metal over angle iron frame anchored to wall and floor. The low end of the unit is $8\frac{1}{2}$ ft long, 2 ft deep and 30-in. high. The large part is $14\frac{1}{2}$ ft long, 7 ft high and 2 ft deep, with four compartments—one double door, and three single. The interior is aluminum painted and the overhead lights are automatically turned off and on by doorjam switches.

The illustration shows the arrangement of shelves, bins and drawers in the different compartments which allow easy access to tools and supplies and save so much

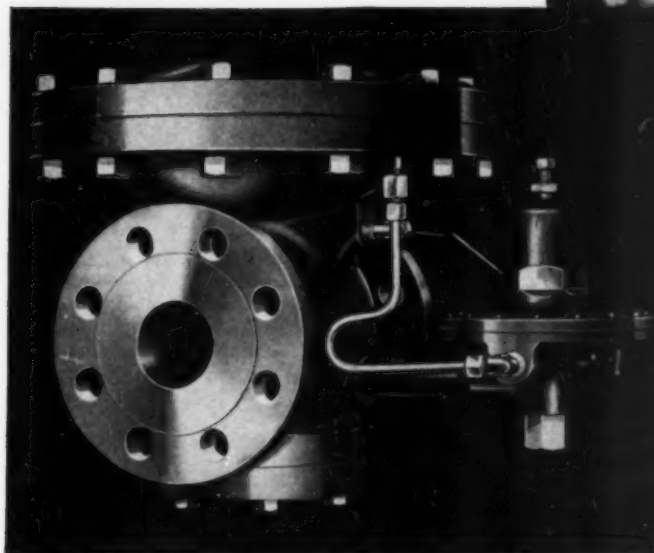
time around the work bench.—
JOHN W. MURPHEY.



THE

Old Faithful

OF STEAM PRESSURE REGULATION



BUILT FOR UNFAILING SERVICE

Power engineers everywhere have ok'd the Fisher Type 92A for steam pressure control! It's an accurate, compact, flexible, sturdy controller, designed, built and proved to meet the most exacting requirements for steam service.

SINGLE SEATED • TIGHT CLOSURE

The single seated hardened stainless steel construction assures tight closure and prevents excessive pressure build-up. Sizes: 1/4" to 2" screwed; 1" to 6" flanged. Reduced

pressure ranges 3 to 200 PSI. Inlet pressure up to 250 PSI at 450° F. Pilot inner valve and seat of hardened stainless steel to give long life under wire drawing conditions.

Fisher Bulletin C-3 gives full details. Write for your copy today.

FISHER GOVERNOR CO.

MARSHALLTOWN, IOWA



FISHER[®] TYPE 92A

**PILOT OPERATED
CONTROL VALVE**

ACCURATE

Responds with its extreme sensitivity to flow changes — maintains the desired reduced pressure with maximum accuracy. No auxiliary pilot operating system is needed.

FLEXIBLE

Designed for the high-pressure service, the Fisher Type 92A is available in all sizes and materials. The valve is easily adjusted or changed to obtain a variety of reduced pressure ranges. Leads used in making to meet wide variety of operating conditions.

Maintenance Notes for Electrical Equipment in Hazardous Locations

By UNDERWRITERS' LABORATORIES, INC.

Important as it is to give good care to all electrical equipment, it is especially necessary that equipment for use in hazardous locations be properly installed and maintained in order to insure its safe operation.

IT IS generally recognized that continued safety of installations of electrical equipment for use in Class I and II hazardous locations,* as defined by the National Electrical Code, will depend upon proper maintenance. This is emphasized in the National Electrical Code, Article 500, paragraph 5002, quoted in the following "Special Precaution. The intent of this article is to require a form of construction of equipment, and of installation that will insure safe performance under conditions of proper use and maintenance. It, therefore, is assumed that inspection authorities and users will exercise more than ordinary care with regard to installation and maintenance."

Maintenance of electrical equipment should be conducted by personnel familiar with the function and purpose of the equipment, and the hazards involved. Some important features of maintenance having general application to electrical equipment for use in hazardous locations are discussed below, and, in addition, it is also essential to adhere to the advice of manufacturers with respect to maintenance or servicing of specific equipment.

Disconnect From Lines

Electrical equipment should be disconnected from the supplying circuits before disassembling, including partial disassembling of lighting fixtures or units for relamping, and should be tightly reassembled before connecting circuits.

Machined Surfaces

Machined metal surfaces forming joints in casings or housings of electrical equipment should be protected from mechanical injury and kept clean. In disassembling or assembling the equipment, hammers or prying tools should not be used where they come in contact with the machined surfaces of joints. Before assembling, remove all old grease, dirt, paint or other foreign material on surfaces forming joints. A thin coating of new grease of a type recommended by the manufacturer of the equipment should be applied to joint surfaces,** particularly in the case of threaded joints between aluminum sections.

Holding bolts of enclosing cases, and threaded parts, must be screwed tight.

Do Not Make Openings

Safety of use in hazardous locations will be endangered should openings or other alterations be made in the devices. Rotating shafts should turn freely, but clearances at shaft openings should never be increased to accomplish this. Manufacturer's advice with respect to lubrication and other servicing of bearings should be followed.

Overload Protection

Protection against explosions in hazardous locations requires that all electrical equipment exposed to the hazardous atmospheres be of a type suitable and safe for installations in such locations.

Equipment should be installed in circuits with overload and short-circuit protection for established ratings. When these protective devices open the circuits, investigations should be made to determine the cause, and the circuits should not be restored until the electrical fault or other defect is corrected.

Portable Equipment

It is recognized that portable equipment should be used only where necessary, inasmuch as electrical connections to such equipment by means of the best available type of extra hard-usage rubber-covered flexible cord present a less safe construction than devices connected to supply lines using threaded rigid conduit. The flexible cord connecting to portable equipment should be frequently inspected and replaced when necessary. Terminal connections to the cord must be properly made and maintained. Safe use also depends on the maintenance of insulation at current-carrying parts of the plug and receptacle. These devices should, therefore, not be used where the insulation may be impaired by moisture, dirt, or other foreign material.

Good Housekeeping

Good housekeeping will contribute greatly to the safe and efficient operation of electrical equipment for use in hazardous locations. Inasmuch as it is not good practice to allow combustible dust to accumulate on equipment or in buildings, electrical equipment should be kept clean, particularly when installed in Class II hazardous locations. In painting the exterior of casings or housings, care should be taken not to obscure the name plate or any cautionary or informative statements on the enclosure. Electrical equipment for use in hazardous locations is intended for use indoors where severe corrosive conditions are not likely to be present.

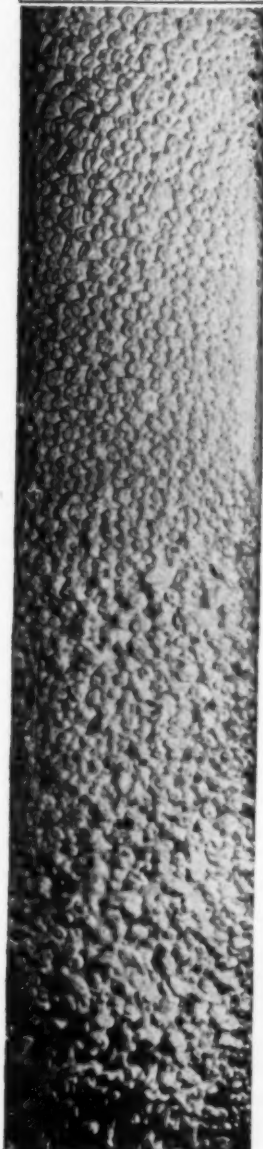
*See Underwriters' Laboratories, Inc.'s Data Cards E 32, UL27a and UL27b, titled "Electrical Equipment for Use in Hazardous Locations."

**See Underwriters' Laboratories, Inc.'s Data Card E 32, UL116, titled "Explosion-Proof Equipment—Effect of Grease on Joints."

CONCENTROL STOPS FOAMING

BEFORE

Laboratory demonstration shows foaming of highly alkaline solution in test cylinder.



AFTER

Same solution after addition of 12 ppm of Concentrol Anti-foam. Constant heat conditions were maintained during test.



This laboratory demonstration shows — as do scores of successful installations — that Bird-Archer's Concentrol is a highly effective anti-foam agent. It quickly stabilizes alkaline boiler water . . . eliminates foaming action and carryover. With Concentrol, you can forget about bouncing water gages. You get good quality dry steam every hour of every day.

Concentrol is available in liquid, powdered or briquette forms. Special Concentrol formulations are also available containing other commonly used boiler water treatment chemicals such as tannins, phosphates, alkalies, sulfite, etc.

See for yourself how economical Concentrol helps improve steam quality. Your Bird-Archer representative will demonstrate Concentrol in your plant . . . make specific recommendations for its use. Consult him, or write direct to Bird-Archer, outlining the details of your boiler operation.

FREE DATA SHEET AVAILABLE

HOW CONCENTROL WORKS

Concentrol works by effecting a rapid change in surface tension of steam bubbles which permit coalescence of small steam bubbles into bubbles of larger sizes. This results in the formation of unstable bubble films which break readily upon reaching the steam disengaging surface of the boiler water. This does away with foam build-up and subsequent carryover.



BIRD · ARCHER WATER TREATMENT

THE BIRD-ARCHER COMPANY

4337 North American St., Philadelphia 40, Pa.

NEW YORK · CHICAGO

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Calderas y Accesorios, S. A.
Amsterdam 291, Mexico D. F.

BA 162

New EQUIPMENT for Southern Industry

Self Priming Pump

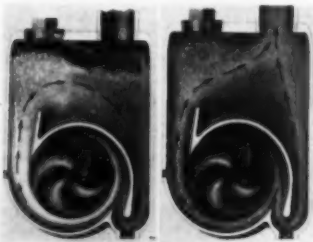
N-1 INGERSOLL-RAND COMPANY, 11 Broadway, New York 4, N. Y., has introduced a new line of self-priming Motorpumps, intended for pumping applications under suction lift where the presence of air or vapor makes it impractical to use the conventional centrifugal pumps, such as in process and bulk station applications, for mine drainage, bilge pumping, sump draining, and irrigation service.



Ingersoll-Rand's self-priming Motor-pump.

Conventional centrifugal pumps are unable to eliminate appreciable volumes of air or vapor when operating under suction lift and may completely lose prime when such vapor is present. To reestablish prime, it becomes necessary to fill the suction line and casing before starting.

The new self-priming pump overcomes this disadvantage by means of recirculating liquid trapped in the casing. The pump impeller discharges through two passages into a discharge chamber. During priming the upper passage discharges a mixture of vapor and liquid into the discharge

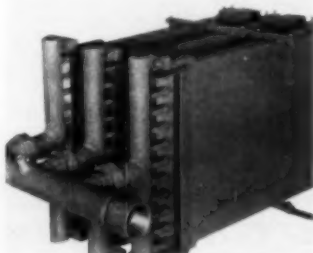


I-R self-priming Motorpump recirculates liquid trapped in the casing.

chamber. Here the vapor separates from the liquid and passes out the discharge pipe. The remaining liquid reenters the impeller through the lower passage to mix with more vapor drawn in from the suction pipe and is separated from the liquid in the same manner. When the suction pipe is finally filled with liquid and the pump is primed, flow through the lower passage reverses and both passages act as normal pump discharges. During normal pump operation there are no recirculation losses and thus no need of valves to cut off recirculation. No flap valve is used because the pump casing is so proportioned that sufficient liquid is trapped on shut down to insure priming when the unit is re-started.

New Gas Burner Design

N-2 THE WEBSTER ENGINEERING COMPANY, Tulsa, Okla., announces the Rectilinear gas burner, which causes unique application of the venturi principle.



These three Webster Engineering Rectilinear gas burners are gang mounted and manifolded with a single inlet.

The new unit provides high input through narrow rectangular openings. Its small dimensions and unusually light weight simplify the application problems in adding gas firing over stokers and oil burners already in service. Practical applications may be made at pressures as low as 1 psig.

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

The unit will modulate to 4 oz without flashback.

The unit was originally designed to provide a primary air inspiring gas burner with a rectangular flame retention nozzle suitable for inter-tube firing of water walled combustion chambers.

Applications include firing a horizontal plane through fire doors or small openings over handfired coal grates, firing in a vertical plane on either side of a stoker or oil burner, and firing in a horizontal plane over oil burners or stoker hoppers.

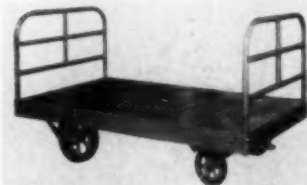
Medium Duty Trailer

N-3 THE MARKET FORGE COMPANY, Everett, Mass., has introduced a new trailer designed to replace old-style wooden trucks for handling bagged material or to carry one or more pallets loaded with bagged material.

The smooth steel construction with rounded corners and edges prevents bags and other materials from being torn. Each end of the trailer is equipped with tubular racks which are also welded to prevent injury to material. These racks are removable.

Loops are provided on each side for diagonal-type coupler rods. These rods permit backing with a tractor without "jack-knifing."

Specifications are: Capacity—3000 lb; Length—69"; Width—36"; Height of end racks—23"; Height deck from floor—14".



Market Forge Co.'s new trailer is of steel construction with rounded corners and edges to prevent materials from being torn.

FOR PERFORMANCE YOU CAN **BANK** ON



Operating economy is an important factor in the selection of steam generating equipment; but equally important is dependability. These two basic considerations are such well-known attributes of Superior Steam Generators that Superior units are repeatedly specified for public utilities, hospitals, industrial plants, and similar critical installations.

Superior Steam Generators are built to develop their maximum rated capacities at thermal efficiencies guaranteed to exceed 80% . . . not for a day, or a month, but for years to come.

You can **bank** on their savings due to operating economy . . . but, more important, you can **bank** on the dependability of Superior Steam Generators for years of trouble-free service.

FOR COMPLETE DETAILS, WRITE TODAY FOR THE NEW FULLY ILLUSTRATED CATALOG 411 . . .

Fully automatic. Burns gas, or oil, or both.
18 sizes ranging from 20 up to 600 b.h.p.
for pressures to 250 p.s.i. or for hot water.

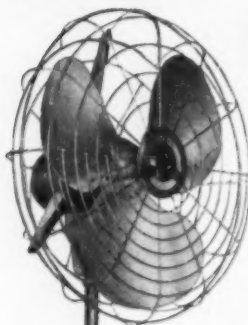
for performance you can **BANK** on

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 18, N.Y.

SUPERIOR
STEAM GENERATORS

ACTIVE AIR

for People Indoors



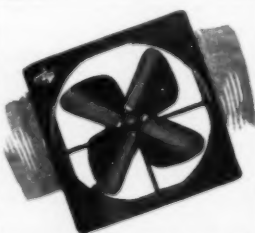
Stale, dead air is a serious handicap to efficient operation of business and institutional buildings. Remember, customers, clients, patients, employees are favorably affected by "Active Air," air in motion.

Emerson-Electric Air Circulators and exhaust fans will keep the air ACTIVE in your buildings for years to come.

cut costs with

EMERSON-ELECTRIC AIR CIRCULATORS

SPECIFICATIONS: Available in either 24" or 30" blade sizes, with two-speed, ball-bearing capacitor-type motors for long, efficient service. Full-type aluminum blades operate quietly, yet move a huge volume of air. Grease-packed bearings give 6,000 hours of service without relubrication. Your choice of four mountings: floor, counter, wall or ceiling. Backed by famous 5-Year Factory-to-User Guarantee. For complete information write for free Bulletin 269.



EMERSON-ELECTRIC EXHAUST FANS

For complete ventilation of your buildings investigate Emerson-Electric's complete line of direct- and belt-drive exhaust fans. Capacities ranging up to 19,350 c.f.m.

THE EMERSON ELECTRIC MFG. CO., St. Louis 21, Mo.

EMERSON
FANS • MOTORS



ELECTRIC
APPLIANCES

new equipment (continued)

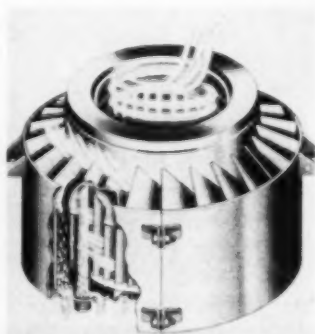
For more data circle item code number on the postage free post card—p. 17

Steam Purifier

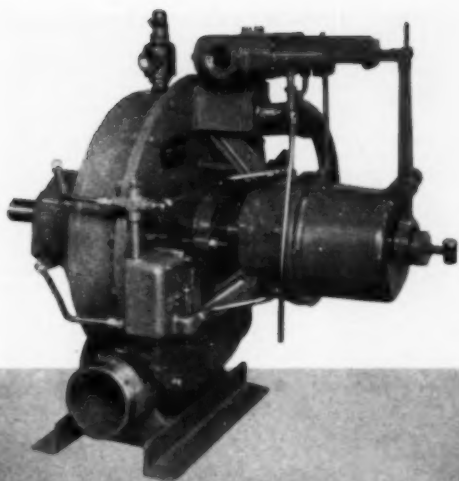
N-4 THE V. D. ANDERSON COMPANY, 1935 West 96th St., Cleveland 2, Ohio, has announced the first in a new line of low-cost steam purifiers.

This purifier is of the internal type and has a wide range of applications. It is known as the Hi-eF Purifier, and the manufacturer guarantees it to deliver vapor with 1.0 ppm or less of total solids. According to the manufacturer, advantages of the purifier are reduction of operating, maintenance and replacement costs. The design provides for a self-cleaning action, contains no moving parts, and eliminates the need for baffling in boilers and drums essential with conventional separators.

In operation, entrainment is removed in three stages. The entrainment laden vapor enters the top of the purifier as far away from the liquid level as possible, passes downward in a rotary motion. This action develops centrifugal force, which removes the greater portion of the entrainment at this stage. In the second stage of separation, the rapid rotation is reduced to slow linear flow causing additional entrainment to drop out. Again in the last stage further centrifugal force is developed effecting practically complete removal of any remaining entrainment before the vapor continues up and out the evaporator outlet. Entrainment is discharged below the liquid level by means of ejects.



V. D. Anderson's Purifier, delivering vapor with 1.0 ppm or less of total solids, applicable inside steam drums, flash tanks, evaporators, packed towers, deodorizers and stills.



Wing

AUXILIARY

TURBINES

WING TURBINES are especially economical for driving pumps, fans, compressors, etc., in plants using steam in process operations. The turbines act as reducing valves on boiler steam pressure, therefore, being practically free.

Wing Turbines for over half-a-century have been noted for their rugged construction, trouble-free operation and long life.

Maximum BHp 150. Maximum Steam Temperature 750°F. Maximum Pressure 600 lbs. Back Pressure to 50 lbs. Speeds to 4000 rpm.

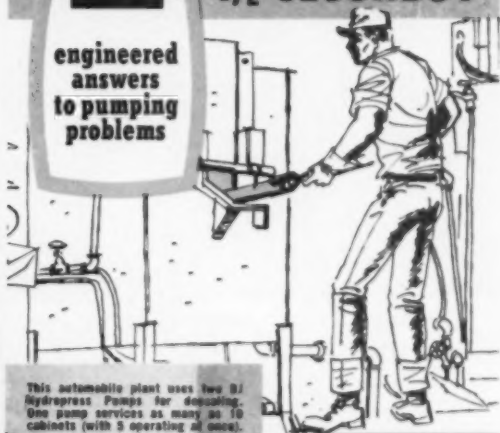


L. J. Wing Mfg. Co.
Linden, N. J.

Offices in principal cities

KNOCKS OFF SCALE IN BJ 1½ SECONDS!

engineered
answers
to pumping
problems



This automobile plant uses two B.J. Hydropress Pumps for descaling. One pump services as many as 10 cabinets (with 5 operating at once).



Auto industry uses
BJ Hydropress
Pumps to descale
forged parts
hydraulically!

Manual or mechanical descaling operations are time-taking and profit-robbing. Especially when a product requires several descalings during production. You'll save time, money and rejects by descaling hydraulically with BJ Hydropress pumps.

Here's one of the many examples of modern hydraulic descaling as used by the automotive industry. During the heating of axle bars prior to forming, scale is created and must be removed. This is done in a hydraulic descaling cabinet. As the bar is inserted, a lever is tripped and high velocity water at 1500 to 2000 psi hits the bar from 3 to 5 nozzles. Scale is removed in 1½ seconds! Afterwards the hot bar is placed on a forming roll.

The BJ Hydropress pump is ideal for this type of work because of its unique construction features. It does not require relief valves, accumulators or extra heavy fittings and piping. Its double volute design creates inherent balance at all heads and capacities. Its vertical construction allows the use of a simple foundation and a minimum of floor space.

For more information call your local BJ sales engineering office or write:

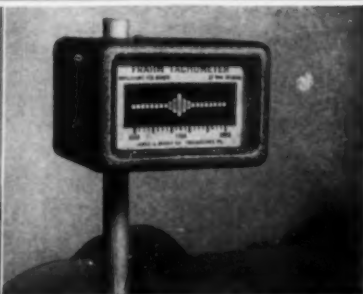
Byron Jackson Co.

P. O. Box 2017, Terminal Annex, Los Angeles 54, California
Sales Offices in Principal Cities

BIDDLE

Instrument News

BOOTH
510



MEASURE SPEED BY RESONANCE

FRAHM® RESONANT REED TACHOMETERS

The Miniature Frahm instruments shown above weigh about 12 ounces and measure approximately 3" x 2" x 2 3/4". Various speed ranges are available from 1000-1500 to 9000-13,000.

The phenomenon of resonance activates the delicately tuned reeds when touched to any part of a rotating machine or when permanently mounted. 60° or 90° brackets are furnished where mounting is desired. In confined spaces, the convenience of merely touching the instrument to

any part of the machine casing is highly desirable and a considerable safety factor.

Since there are no movable parts in Frahm Resonant Reed Tachometers there is nothing to require maintenance. They are built to take rugged handling.

Frahm Tachometers are made in a variety of shapes and sizes with splash-proof cases and reeds tuned to, guaranteed accuracy within 0.5%.

Write for Bulletin 31-SP.

WIDE RANGE PRECISION HAND TACHOMETER THE DR. HORN TACHOMETER



We are now prepared to make immediate delivery of this instrument, considered by many to be the ultimate in a fine speed measuring device. Pointer affords instantaneous reading of rpm of rotating shafts, or linear and peripheral speeds, regardless of direction of rotation. Measures in six ranges from 25 rpm to 30,000 rpm. Protected against overspeeding damage. Operates equally well in a vertical, horizontal, or slanting position. Simple mechanism. Low maintenance. Long life.

James G. Biddle Co. is the sole distributor and authorized service agency for these highly regarded instruments.

Write for Bulletin 35-65-SP.

**JAMES G. BIDDLE CO., 1316 ARCH ST.
PHILADELPHIA 7, PA.**

ELECTRICAL TESTING • SPEED MEASURING INSTRUMENTS • LABORATORY & SCIENTIFIC EQUIPMENT

new equipment (continued)

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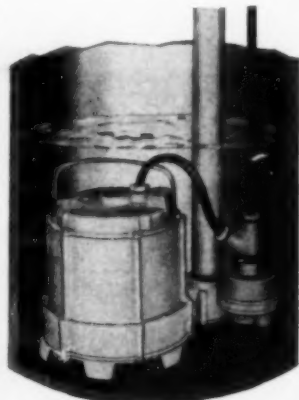
Utility Pump

N-5

KENCO, INC., 1125 North Ridge Road, Lorain, Ohio, is marketing a completely submersible utility pump adaptable for use in the many types of sumps found in factory layouts such as boiler room pits, underground utility installations, elevator pits, and other low areas, as well as for draining flooded areas and buildings, pumping out new excavations for buildings and ditches, and draining tanks and vats.

The submersible feature is made possible by the patented automatic liquid level control switch which eliminates the need for a float. This switch which has no moving parts exposed to water, turns the pump on automatically as a result of air pressure created by water rising in the switch skirt moving a diaphragm which in turn trips the switch. Water, silt or other debris cannot foul the switch. The low turn-off point is obtained since pumping action sustains switch operation and thereby makes it possible to pump a sump dry within 1/2 inches of the bottom. In sump usage, since the pump is submersible, the entire portable unit can be installed right in the sump in a few minutes rather than having the motor on top of the sump supported by a permanent mounting. The motor is hermetically sealed in oil, requiring no oiling or greasing.

The pump weighs only 50 lb, measures 9 1/2 inches high and has a maximum diameter of 13 inches. It is of all bronze construction. Capacity is 3300 gph. It is driven by a 1/3 hp motor.



No floats or parts to oil or grease in Kenco's submersible utility pump.

Package for Triplets

WATER FOR TRIPLE BOILERS INDIVIDUALLY TREATED BY SINGLE PACKAGE



Assembly includes 3-
Model SHPM Adjust-O-
Feeders — Capacity 7.5
GPH against 225 psig —
handling phosphate and
sulfite solutions.

This %Proportioners, Inc. % packaged system includes metering pumps, chemical tanks, motor starters, controls, valves, piping, and all auxiliary equipment — compactly arranged as a single unit. Treating chemicals are fed automatically in proportion to service load on each boiler. This "Triplet Package" is supplied com-

plete—a single responsibility for your chemical feeding system. We can also supply systems for treating one, two—or any number of boilers: chemical feeding systems for any power plant from the largest high pressure installation to the smallest low pressure job. For recommendations call in %Proportioners, Inc. %.

Write for Brochure SM 9020

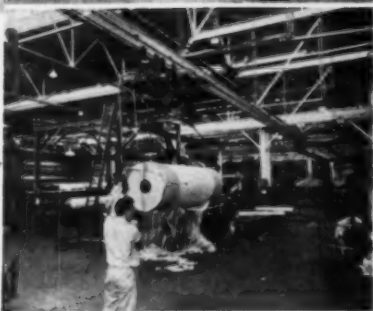
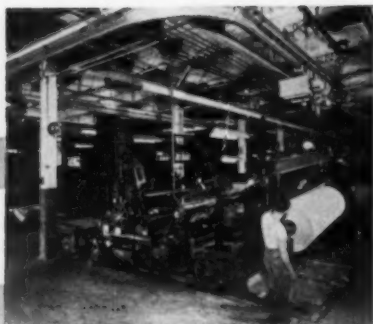
"Treatment of Water for Boilers" and Bulletin CAT.

% PROPORTIONERS, INC. %

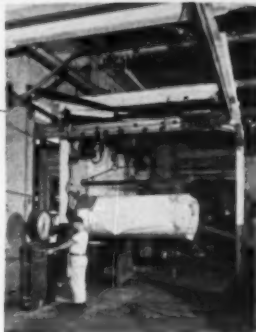
Write to %PROPORTIONERS, INC.%, 393 Harris Ave., Providence 1, R. I

Technical service representatives in principal cities of the United States, Canada, Mexico and other foreign countries.

IT TOOK
"BACKACHE"
 AND
"HEADACHE"
 OUT OF
 HANDLING



This American MonoRail Overhead Handling System entirely eliminated all problems previously encountered. The system, consisting of 1650 feet of track, 8 carriers with electric hoists and MonoTractor drive, a power-operated crane, three track scales and the normal complement of track switches, produced the following improvements:



1. Operator fatigue was greatly reduced.
2. Traffic flowed freely—no aisle congestion.
3. No side-tracking during travel—time saved.
4. Loads automatically weighed—no transfer to scales.
5. Damage to floors completely eliminated.
6. Damage to load greatly reduced.

Let an American MonoRail engineer show you how it can be done in your plant, at no obligation, of course. Send for C-1 Bulletin.

THE AMERICAN MONORAIL COMPANY

13105 ATHENS AVENUE

CLEVELAND 7, OHIO

new equipment (continued)

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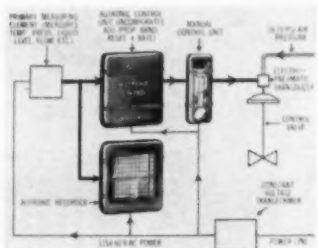
Electronic Control System

N-6 THE SWARTWOUT COMPANY, 18511 Euclid Ave., Cleveland 12, Ohio, has announced a new automatic all-electronic instrumentation and control system for use in chemical and food processing plants, refineries, petrochemical installations, industrial power plants and central stations.

The new Autronic control system is a centralized-control, miniature, all-electronic system for measuring and controlling process variables such as temperature, pressure, level and flow. It consists of three basic units: primary sensing element, Autronic control unit, and final control element. The system is powered by 115 v 60-cycle alternating current.

The primary sensing element generates a voltage which is directly proportional to any change in the process variable. This voltage, always within the same range regardless of whether temperature, pressure, flow or level is being measured, is transmitted to the Autronic control where it is continuously modulated by electronic means. The Autronic control unit then transmits the resulting direct current to the final control element which may be either electrically or pneumatically operated.

The control unit can be mounted at any convenient location so that all adjustments can be made at the graphic panel or central control point without the usual transmission lags. The unit incorporates accurately calibrated adjustments for proportional band, reset, and rate time (derivative). It can be furnished with or without set-point adjustment and scale.



Swartwout's all-electronic system for measuring and controlling process variables (temperature, pressure, level and flow) was displayed for the first time at the recent National Instrument Exhibit in Houston.

Float Valve

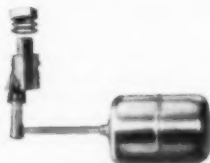
N-7 McDONNELL & MILLER, INC., 3500 N. Spaulding Ave., Chicago 18, Ill., have announced a new float-operated valve for liquid level control applications.

Features of the new valve are large capacity for its compact size, non-corrosive construction, and simplicity of design and operation. Three variations of the valve make it adaptable to a variety of operating conditions.

The No. 18 consists of the valve mechanism and float. The No. 118 is a variation designed to offer protection against back-siphonage; it has the float mounted at right angles to the valve so the valve proper is always far above the water level. The No. 518 includes the float and valve in a die-cast chamber, with a well-fitting cover, and is designed for external applications such as on humidifiers.



No. 18



No. 118

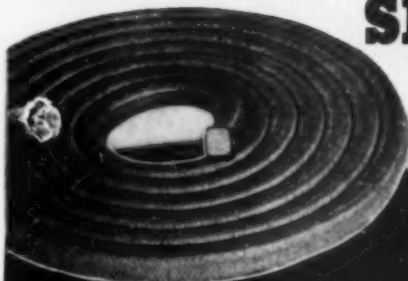
Large capacity for its size and non-corrosive construction features of the McDonnell float valve.

The valve mechanism itself consists of only a few parts. Except for the neoprene valve seat, all parts are of copper or brass. The valve opens to full capacity with only small float drop, and closes tightly against supply pressures up to 100 lb. The entire assembly is held together by a single sturdy brass pin, so it can be disassembled easily for inspection or cleaning.

The No. 18 model can be used on humidifiers of warm air furnaces; on evaporative conditioning equipment; on wet and dry bulb hygrometers; on ice cube freezers. It is also serving to add water to radiators of stationary engines.

Capacity of the No. 18 valve ranges up to almost 1500 gph, depending on supply pressure. For mounting the valve, water supply connection has a $\frac{1}{4}$ "-18 machine thread with matching nut and washers. For actual water supply line, either $\frac{1}{2}$ " pipe or $\frac{1}{4}$ " O.D. tubing—this same connection has a $\frac{1}{8}$ " pipe tap.

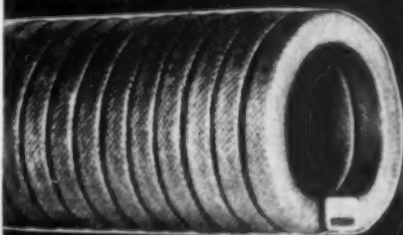
IT WON'T ESCAPE... IF IT'S BELMONT SEALED!



BELMONT 189... for cold and hot oil rods and plungers.



BELMONT 19... for hot and cold water rods and plungers; low and intermediate steam rods.



BELMONT 30... for high pressure steam rods, expansion joints, air, and gas.

BELMONT Packings, unlike "run of the mill" packings, are the remarkable, trouble free, product of packing specialists who have devoted more than half a century to the problem of producing packings with a Better Seal and Longer Life.

Today, more than ever before, production schedules must be maintained without interruption. Your insurance against service interruptions and mounting maintenance costs due to packing failure is BELMONT; the Packing that will withstand the ravages of TIME as well as Steam, Water, Oil, Gas, Air, Alkalies, Ammonia.

There's a Belmont Packing for EVERY SERVICE... hundreds of styles enable you to select the correct basic raw materials and constructions to suit individual job requirements. Packed in the blue box with the orange colored trade mark, Belmont BETTER SEALING... LONGER LASTING Packings are available through distributors everywhere. RINGS, SPIRALS, COILS, REELS, SPOOLS, SHEETS and GASKETS. For special engineering help, write direct.

THERE'S A BELMONT PACKING FOR EVERY SERVICE

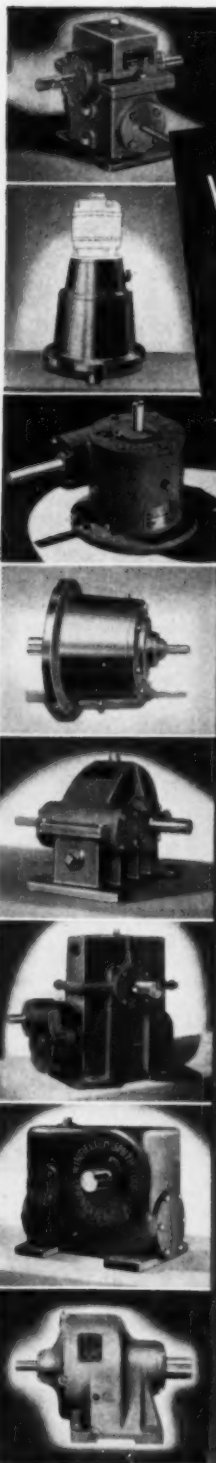
THE BELMONT PACKING
AND RUBBER CO.

Butler and Sepviva Streets
Philadelphia 37, Pa.



Catalog #40 is available,
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4-1-1



widest range of
designs and sizes
from 1/100 to 85 hp

If your speed reducer need not handle any mechanical through 85 hp motor...
...the required ratio and from 1:1 through 100:1...
...If your maximum output torque must be between 34 and 113,000 lb.-ft., WinSmith is the only name you need remember.

Only WinSmith covers this range so completely. Only WinSmith has so thoroughly standardized this range in a carefully graduated series of sizes.

And within this range... from this one source... you have the widest diversity of sizes and shaft locations in the worm, helical and worm-helical types, plus the unrivaled scope of the WinSmith patented differential gear design.

Yes, WinSmith is an important name to remember in speed reducers. It means as much to the design engineer in fulfilling his exacting needs, it means as much to the user in its excellent performance.

FOR THE FACTS, Request "Save Through Standardization" folder.

WINSMITH, Inc.
285 Spring St.
Springfield (Hart County) N. Y.

WINSMITH
SPEED REDUCERS

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Rotary Pump

N-8 WORTHINGTON PUMP AND MACHINERY CORPORATION, Harrison, N. J., has added to its line of rotary pumps a heavy duty, vane type rotary pump.

All models are positive displacement, sliding vane type in which the pressure of the liquid being pumped maintains contact of the vanes against the liner.

The pumps are available in both internal and external bearing design; the external bearing models are especially suited for non-lubricating liquids such as gasoline and kerosene. The pumps are manufactured with built-in relief valve and can be obtained in either standard fitted, bronze fitted, or all bronze construction.

Constant Support Hanger

N-9 GRINNELL COMPANY, INC., Providence, R. I., is now producing a new constant-support hanger, providing simplified field adjustment, increased travel range, and greater load capacity with a smaller number of springs and fewer chassis sizes.

The function of a constant-support hanger, to provide equal lift in all positions of travel of a piping system as it moves from expansion or contraction between its hot and cold positions, is said to be performed more perfectly with the new model. A hanger structure designed for center



Grinnell Constant-Support hanger.

support which places equal dimensions on each side of the center supporting line, non-resonance in its springing system and provision to give less horizontal shift of the load line as the load shifts from cold to hot positions are three new refinements incorporated in the new design. Maximum travel with constant support has been increased from its former 4 to 5-in. in the medium chassis and from 8 to 10-in. in the large chassis. The total load range which formerly required 28 sizes is now covered by only 16 sizes.

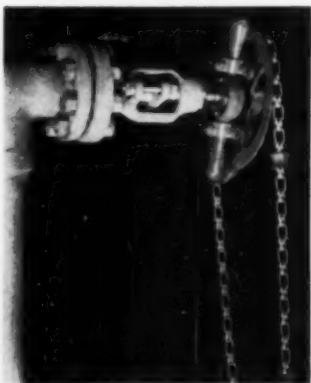
Impactor Handle

N-10 EDWARD VALVES, INC., East Chicago, Ind., has announced production of an extra torque impactor handle adaptable to small chainwheel operation.

The new impactor handle is designed so that the lugs on the underside of the handle strike simultaneous blows against the lugs of an adaptor securely attached to the valve stem. The simultaneous blows prevent stem twist and distortion which would result if the adaptor lugs were struck independently.

The handle is available with two adaptors of different size square openings to fit most standard size stems of various small valve makes. Sizes of the square openings, which taper toward the top, are 13/16" and 15/16" with total taper equal to 3/4" per foot.

The impactor handle is now being used with handwheels of various designs in power plants, refinery, chemical, industrial and technological installations.



The Edward 2-in. angle valve with impactor handle and conventional chainwheel. Handle gives valve operator 2.8 times more closing force.

THIS LUBRICANT SAVES 7 TIMES ITS COST IN PRODUCING SHOES!



**This nationally known
tanner and manufacturer
of work shoes and gloves writes us . . .**

"... You recommended to us LUBRIPLATE NO. 100 for lubricating the chain drive on our paddle wheels which turn the hides immersed in a solution in concrete vats. The chain, during use, is always soaked. The solution is sometimes acid and sometimes caustic. Up to the time of your recommendation, we had not found any lubricant that would stay on the chains for any appreciable time.

"Heretofore, the average life

of a chain was approximately one year. We have applied LUBRIPLATE to these chains every two weeks for two years. Since then, not one new chain has required replacement, and they are still going strong.

"At this time it appears that for every dollar we have invested in LUBRIPLATE, we have saved seven dollars in chains with actual savings still to come."

**WOLVERINE SHOE & TANNING CORP.
Rockford, Michigan**

You, too, can enjoy the savings made possible with LUBRIPLATE Lubricants. There is a LUBRIPLATE product for every industry. LUBRIPLATE reduces friction and wear, prevents rust and corrosion and is most economical to use. Write today for case histories of savings made possible by the use of LUBRIPLATE Lubricants in your industry.

**LUBRIPLATE DIVISION • Fiske Brothers Refining Company
Newark 5, New Jersey • Toledo 5, Ohio**

DEALERS EVERYWHERE • SEE YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE the Modern Lubricant

new equipment (continued)

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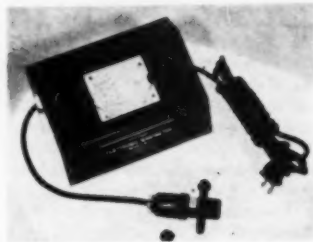
Electronic Manometer

HASTINGS INSTRUMENT COMPANY, INC., Super Highway & Pine Ave., Hampton 10, Va., announces a new type, highly sensitive electronic manometer and flowmeter, having no glass or plastic tubes and containing no fluids.

The electronic manometer operates from a metal thermopile using the same principles which the manufacturer has applied to vacuum and air

velocity measuring instruments. The two taps on the gauge tube are connected to the two points at which the pressure difference is to be measured. To use the instrument as a flowmeter, the tube is placed directly in the line for low flow rates or connected to pressure taps on two sides of a calibrated orifice for high flow rates.

The instrument will measure extremely low pressure differences and has a dual range of 0.001" to 0.1"



Electronic manometer and flowmeter of Hastings Instrument Company.

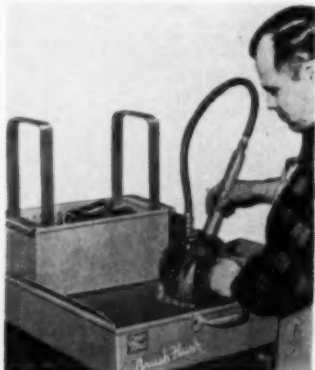
and 0.1" to 2" water. It may be used for direct indications or attached to a recorder. The calibration and accuracy of the instrument is not affected when long extension cables are used from the gauge tube to the meter. This permits remote installation of the gauge tube, which is advantageous in many manufacturing processes. The gauge tube can be permanently installed as it is not damaged by high pressures and causes only an extremely low pressure drop.

Accessories include a 5-position switching attachment, which permits monitoring of gauge tubes in 5 locations with one indicating meter. The instrument operates on 110 v, 60 cycle, a-c. A constant voltage transformer is available.

Parts Cleaner

GRAYMILLS CORPORATION, Evanston, Ill., has recently developed a bench type parts cleaner, the Brush-Flush, with fountain brush action.

The equipment features a hollow handle brush attached to the pump, with a tube, to produce a steady flow of clear solvent at the end of the



Graymills Corporation's Brush-Flush.



BERKELEY DEEPWELL PUMPS FOR EVERY PURPOSE

DEEPWELL JET TYPE WATER SYSTEMS

5 to 25 gallons per minute, $\frac{1}{4}$ to 5 H.P., depths to 300 ft. Write for Bulletins 505, 506 and 510.

BERKELEY CRUSADER DEEPWELL TURBINES

for 4 in. inside diameter wells and larger. 25 to 50 G.P.M., $1\frac{1}{2}$ to 7 $\frac{1}{2}$ H.P., depths to 500 ft. At a setting of 100 ft., these rugged pumping units incorporate 60 less parts than a turbine of conventional design. Operating at 1750 R.P.M., the Crusader is subjected to considerably less wear than any competitive high speed turbine. Incorporating the Berkeley Combination feature, the Crusader maintains pressure for household use while flood irrigating. For more detailed information, write for your copy of Bulletin 802.

BERKELEY COMBINATION DEEPWELL TURBINES

50 to 250 G.P.M., $1\frac{1}{2}$ to 10 H.P., depths to 500 ft. These combination units are the equivalent of two pumps. The booster pump in the head provides ample high pressure water for a pressure system, while the turbine supplies a steady high capacity stream for irrigation. Write for Bulletin 801.

DEEPWELL IRRIGATION TURBINES

for high capacity pumping, depths 500 feet, 200 G.P.M. and up. Available oil or water lubricated, enclosed or semi-open impellers.

Illustrated at the left is a Model 1403HH, capable of capacities in excess of 2500 G.P.M. Write today for Bulletin 811.

BERKELEY PUMP COMPANY



554 TIFT AVENUE, S. W., ATLANTA, GEORGIA DEPT. M

bristles. Oil, grease and dirt are flushed away as they are loosened with the brush. Three gallons of the company's UL listed solvent are required for one filling.

Cleaning solution flowing from the brush is kept clear by double filtering arrangement. Parts are cleaned on the large screen platform. Small particles of grit and chips passing through the platform screen are retained by the baffle or second filter screen located at the pump intake.

The cleaner is generally placed on the work bench and plugged into any 115 volt electric outlet. Nylon fountain brushes are available.

Industrial Cleaner

N-13 PATTERSON PRODUCTS, 518 Maccabees Bldg., Detroit 2, Michigan, is producing a new Vibro-Pneumatic Industrial Cleaner which operates from a compressed air source.

The new cleaner has a unique patented vibrating air valve that creates by the jet principle an agitating suction, which forces dirt and metal particles into a container. The dirt container is supported on the back by a conventional belt and harness assembly and is encircled in a fabric shield.

By operating a second of two fingertip control valves, a vibrating external air jet is created. This jet is directed forward through an orifice in the cleaner head to dislodge dirt and metal particles from inaccessible places to spots where they can be picked up by instantly changing to a suction action.

The cleaner operates from any 80 psi and up compressed air source.



Industrial cleaner of Patterson Products operates from compressed air source.

From start to finish... DIXISTEEL BARS AND SHAPES are quality-controlled



At each step of operation—from the initial charge for the open-hearth furnace to the finished hot-rolled bar or special shape—the quality of DIXISTEEL products is carefully controlled . . . checked and re-checked in our own fully equipped laboratories.

This never-ending effort to maintain high quality has contributed greatly to the progress of Atlantic Steel Company throughout its fifty years of operation.

It is your assurance of steel products worthy of the time-honored name DIXISTEEL.

Atlantic Steel Company

ATLANTA, GEORGIA

PRODUCERS OF FINE-QUALITY LOW-CARBON STEEL PRODUCTS,
INCLUDING: HOT ROLLED BARS, SHAPES AND STRIP—DRAWN
WIRE—NAILS, RIVETS, STAPLES—FENCE AND BARBED WIRE—
FORGINGS AND STAMPINGS.





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In rotary oil burner
sales and installations
throughout the world.*

*U. S. DEPARTMENT OF COMMERCE FIGURES

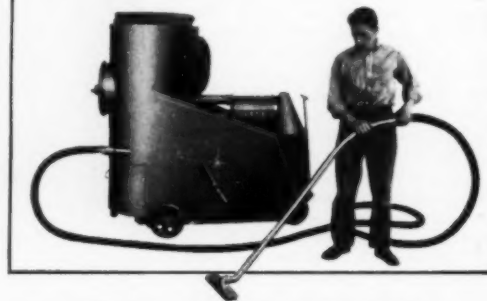
RAY OIL BURNER CO.
SINCE 1872

1301 SAN JOSE AVE., SAN FRANCISCO 12, CALIFORNIA
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PROFIT by the EXPERIENCE of America's FINEST PLANTS

They REPEAT-ORDER
HOFFMAN Heavy-Duty
VACUUM CLEANING EQUIPMENT
for Wider Range Dust Removal!

One installation sells another, as plant after plant finds that Hoffman vacuum cleaning units save labor—save material—reduce product defects—eliminate dust hazards. They've proved that they can clean larger areas of walls, floors and overhead surface with Hoffman equipment. Built to provide bigger capacity, higher vacuum and long years of service on the most grueling plant cleaning jobs.



YOUR CHOICE OF 4 BIG-CAPACITY PORTABLES

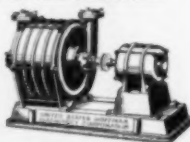
Advanced design and construction features for fast, efficient cleaning, with one-man handling. 1½, 3, 5, and 7½ H.P. models to match your specific cleaning requirements

STATIONARY SYSTEMS IN A WIDE RANGE OF SIZES TO FIT YOUR MAINTENANCE OR PRODUCTION OPERATIONS

Provides cleaning in several areas at the same time. Sweepers attach cleaning hose to conveniently located inlets (in a permanently piped system). Dust is removed pneumatically to central collectors for easy disposal.

MULTISTAGE CENTRIFUGAL BLOWERS AND EXHAUSTERS

For agitation of liquids, combustion, mixing—for all air requirements (including the elimination of compressed air). No internal moving parts. Low power consumption. Adopted as standard in steel plants, textile and ice plants requiring 24-hour continuous service. Wide range of pressures, capacities and vacuum, for air or gas. Tell us your requirements.



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DIVISION

U.S. HOFFMAN MACHINERY
CORPORATION

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CANADIAN PLANT: CANADIAN HOFFMAN MACHINERY CO. LTD., NEWMARSH, ONT.

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Industrial Paint Roller

N-14 THE AMERICAN PRODUCTS Co., 3308 Edison Ave., New York 66, N. Y., announces a new heavy duty paint roller designed for use in heavy industry for large area coverage on walls, ceilings, floors, and structural steel work.

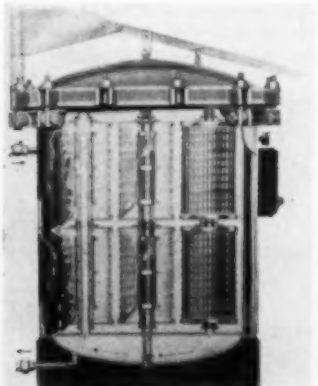


Oil, water, or rubber base paint can be applied with the Arco industrial paint roller.

By making possible the painting of surfaces from a standing position on the floor, this roller is said to cut down hazards inherent in use of ladders and scaffolds. It saves time by holding a substantial amount of paint which can be rolled on the surface rapidly.

Oil Filters

N-15 THE HILLIARD CORPORATION, 102 W. Fourth St., Elmira, N. Y., announces an improved line of lubricating, fuel, and industrial oil filters, including swing-bolt head construction for quick opening of filter covers and a lifting device for ease of handling.

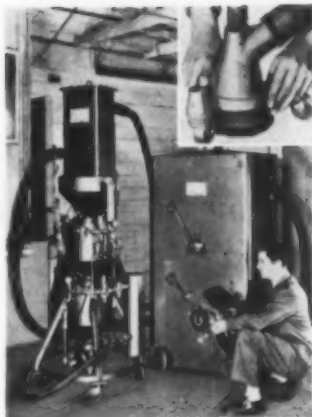


The filters are available using both factory-made filter cartridges and the repackable type which the operator repacks from a bulk supply of filtering material. Filtering materials are available for straight-run mineral oils or the heavy-duty detergent types. Units are available in capacities ranging from 1/2 gpm up to 1000 gpm for bypass filtering of diesel and gas engine lubricating oil and fuel oil.

Blast Cleaner

N-16 VACU-BLAST COMPANY, INC., 350 Peninsular Ave., San Mateo, Calif., is now producing the "Vacu-Blast," compact, movable blast-cleaning equipment for metal, concrete, brick, stone or wood surfaces.

The unit is applicable in welding operations, in the maintaining of rolling stock, plants and buildings. It features a dustless vacuum pickup which removes abrasives and debris simultaneously with the blasting operation. Painters, welders, and others can work alongside the Vacu-Blast

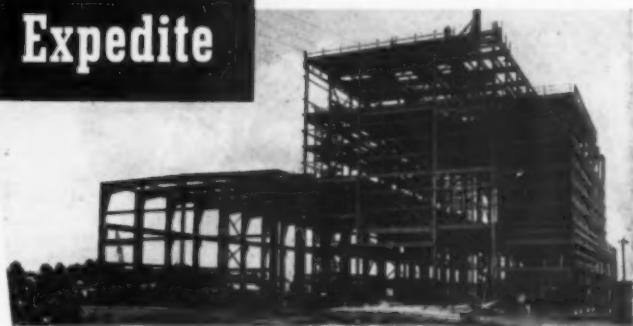


Vacu-Blast removes abrasives and debris simultaneously with the blasting operation.

operator without masks or other protective devices.

The manufacturer recommends the equipment for unusual or difficult blast-cleaning applications such as metal patterns, molds, storage tanks, armatures, steel drums, and concrete surfaces.

Expedite



Ingalls can expedite the construction of your power plant because steel is fabricated in one or more of its plants and delivered to the job by the shortest route ready to be built into the structure.

Phone, wire or write us for assistance in expediting your power plant construction problems.

The Ingalls Iron Works Company

BIRMINGHAM, ALABAMA
SALES OFFICES: NEW YORK, CHICAGO, PITTSBURGH

JEFFERSON

300 LB. Trouble Free Unions for Tough Jobs

JEFFERSON Unions are made of Air Furnace Malleable Iron of an average tensile strength of 55,000 p.s.i., with a yield point of 36,000 pounds and an elongation of 15% in two inches.

Our seat rings are cut from seamless drawn brass tubing, free from all casting defects—sound and uniform always.

They are accurately tapped at all times; are carefully air tested and inspected before shipment, and each and every one approved only if they meet our rigid standards of inspection.

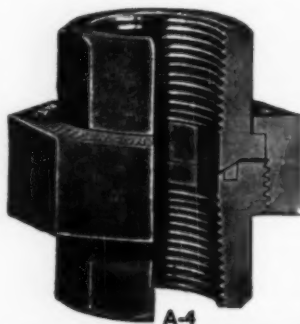
Slightly Higher Priced
But more than worth it.

See these outstanding features—

- ★ A ground hall joint to give leak-proof service
- ★ Octagonal with square corners fits any type of wrench
- ★ No gasket required, hence no maintenance problem
- ★ Hot-dip galvanized to Government Standard for corrosion resistance

Made in all thread sizes from 1/4" to 4" American Standard Taper Threads.

Also manufacture Excel 250 lbs and Master 150 lbs. All unions can be furnished with all-iron seats.



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45 FLETCHER Ave., LEXINGTON, MASS.

News for Southern Industry

SASI Awards

THE SOUTHERN ASSOCIATION OF SCIENCE AND INDUSTRY has announced its 1951 awards for distinguished service in Southern regional development. Selected for most notable service to the South during the past year were COL. E. W. PALMER, of KINGSFORD, TENN., and DR. PAUL M. GROSS, of DURHAM, N. C.

Col. E. W. Palmer, President of the Kingsford Press, has been allied for a quarter of a century with many national, state, and local activities of economic and social significance. The SASI citation commended him particularly for his work as chairman of the National Planning Association's Committee of the South. In this capacity he guided a program of analysis of the region's economic potentialities and assisted in developing programs designed to promote more rapid industrialization of the region.

Dr. Paul M. Gross, Vice President of Duke University and President of the Oak Ridge Institute of Nuclear Studies, has been prominent in scientific affairs nationally for many years. He has been particularly active in the field of agricultural chemistry.

Recipients of the annual SASI awards last year were Thomas W. Martin, Chairman of the Board of the

Alabama Power Company, and Dr. William G. Pollard, Director of the Oak Ridge Institute of Nuclear Studies.

B & W—Houston & Tulsa

Two personnel changes in the Company's HOUSTON, TEXAS, and TULSA, OKLAHOMA district sales offices were announced by THE BARCOCK & WILCOX TUBE COMPANY.

J. H. ROACH, formerly located at the Tulsa office, was transferred to the Houston office and named assistant sales manager. W. C. MOHRMAN, formerly located at the Houston office, was transferred to the Tulsa office and named a district salesman.

Mr. Roach is a native of Houston and has been with the Tube Company since 1939. He was stationed at the Company's sales offices in Houston and Chicago prior to his service at Tulsa where he had been assistant district sales manager since 1946.

Mr. Mohrman, a native of Houston, is a graduate of Rice Institute and has been with B&W at Houston since 1946.

Allis-Chalmers—Washington, Houston

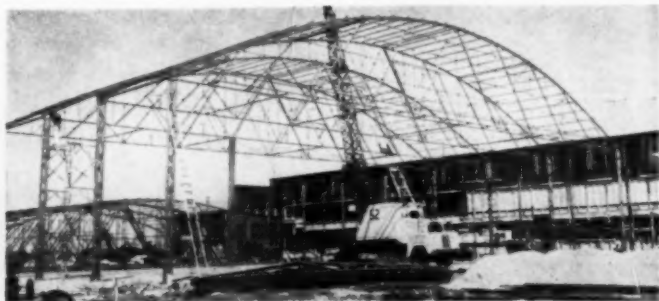
AL MATTHIASEN, formerly an assistant engineer in ALLIS-CHALMERS turbo-power development and steam

TEMCO—Greenville, Texas

Bow String Roof Girders are swung into place on the new production hangar at the TEXAS ENGINEERING AND MANUFACTURING COMPANY, INC., overhaul base at Majors Field, GREENVILLE, TEXAS.

The new addition measures 162 feet by 162 feet 5 inches with a 24-foot overhead clearance.

TEMCO began moving its C-54 overhaul operations from Dallas to Greenville early last summer to make way for expanding manufacturing activities at the Dallas plant. The C-54s now are being overhauled on a production line basis at the Greenville facility, according to TEMCO officials, and the Greenville Division now employs approximately 750 people.



turbine departments, has been named a sales representative in the company's WASHINGTON, D. C., district office. Matthiesen joined Allis-Chalmers in 1948 after receiving his mechanical engineering degree from Northwestern University.

WALTER WINZIG has been assigned to Allis-Chalmers HOUSTON district office as a water conditioning sales representative. A mechanical engineering graduate of Marquette University, Winzig has been associated with Allis-Chalmers since 1949 and has completed the company's graduate training course.

Ingalls Iron Works—Birmingham

JAMES R. MORAN, former industrial and labor relations consultant of Pittsburgh, Pa., has been appointed Director of Industrial and Labor Relations of THE INGALLS IRON WORKS COMPANY, BIRMINGHAM, ALABAMA, and its subsidiaries.

Prior to opening his Pittsburgh office, Mr. Moran was director of labor relations for The Ingalls Shipbuilding Corporation at its PASCAGOULA, MISS., shipyard.

Mr. Moran will make his headquarters at Ingalls' Birmingham office.

Atlas Chain—Southern Representative

H. GILBERT STEWART has been appointed Southern Territory District Manager for ATLAS CHAIN AND MANUFACTURING COMPANY, Philadelphia, Pa.

Mr. Stewart represents the Atlas Company in the following Southern states: FLORIDA, NORTH CAROLINA, TENNESSEE, MISSISSIPPI, GEORGIA, SOUTH CAROLINA and ALABAMA. His headquarters is 2940 Sanford Road (P. O. Box 431), Decatur, Georgia.

FUTURE EVENTS Of Engineering Interest

PLANT MAINTENANCE SHOW, Clapp & Pollak, Inc., 241 Madison Ave., New York, N. Y.
Jan. 14-17, 1952, Industrial Exposition, Convention Hall, Philadelphia, Pa.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Sec'y, 22 West 39th St., New York 18, N. Y.
Jan. 21-25, 1952, Winter General Meeting, Hotel Statler, New York, N. Y.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., Wm. T. Cruse, Exec. V. P., 221 Madison Ave., New York 17, N. Y.
March 11-14, 1952, Fifth National Plastics Exposition, Exposition Hall, Philadelphia, Pa.

AMERICAN SOCIETY OF TOOL ENGINEERS, Harry E. Conrad, Exec. Sec'y, 10706 Puritan Ave., Detroit 21, Mich.
March 17-21, Industrial Exposition, Chicago, Ill.

Nicholson Expansion Steam Traps SAVE \$155 PER UNIT for Large Processor

Because of their positive effectiveness in temperature control work, Nicholson expansion steam traps, at about \$35 each, are being installed by a leading processor in place of temperature controls. These were costing them \$110 to \$200, with cost of trap added. Per installation, the saving is about \$155.

This firm is finding an increasing number of applications on tanks, stills, heating radiators, etc., where Nicholson expansion steam traps are serving as both trap and temperature controller.

Because there is only one mov-

ing part, remarkably low maintenance costs are being shown. Easily installed, usually without supports. Lengths, 9" to 40". Pressure, 0 to 250 lbs. No air binding.



For All Equipment Using Steam or Hot Water

Radiators
Separators
Paper Machinery
Pipe Coils
Kettles
Railway Coaches

Dry Kilns
Vulcanizers
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Catalog 751 or see Sweet's
175 Oregon St., Wilkes-Barre, Pa.

W. H. NICHOLSON & CO.
TRAPS · VALVES · FLOATS

*Bent
or
Straight*

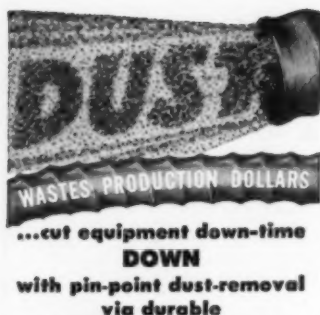
We have them in standard or extra gauges
in all sizes. Accurately fabricated to any
specification.

BOILER TUBE CO. OF AMERICA

McKEES ROCKS, PA. (Pittsburgh District)

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news of the South and Southwest (continued)

C-E-Superheater, Inc., Reports Controlled-Circulation Sales

There are now building, or on order, eighteen large, COMBUSTION ENGINEERING—SUPERHEATER, INC., high-pressure steam generating units of the controlled-circulation type for nine central stations in this country. These units, all ordered within the last 15 months, range in rated output from 750,000 to 1,450,000 lb of steam per hour (100,000 to 200,000 kw) and in design pressures from 1670 to 2650 psig. All employ reheats of 1000 or 1050 F and initial steam temperatures run from 1000 to 1100 F. Each unit will serve a single turbine-generator.

In general, the large units are provided with three circulating pumps, one of which is a spare. These are of the vertical-shaft type, suspended between the suction gate valves and the discharge nozzles.

The following electric utilities are among those which now have controlled-circulation units on order, ranging from 750,000 to 1,450,000 lb of steam per hour, with the turbines served ranging from 100,000 to 200,000 kw. The design pressures range up to 2650 psi and the steam temperatures up to 1100 F. All will employ the reheat cycle:

Virginia Electric Power Co.
Duke Power Co.
Wisconsin Electric Power Co.
Southern California Edison Co.
Cleveland Electric Illuminating Co.
Public Service Electric & Gas Co.
Philadelphia Electric Co.
Consumers Power Co.

Lamson Corp. Administrative Shifts

Furthering proposed expansion of LAMSON CORPORATION of DELAWARE and its operating subsidiary, Lamson Corporation, in related fields of pneumatic dispatch and mechanical conveyor systems, blowers and kindred machinery, are administrative shifts in Lamson Corporation top management responsibilities. The changes are effective Jan. 1, 1952.

Under the revised setup, MR. CARL F. DIETZ, an internationally known mechanical and metallurgical engineer, remains as president of the parent company, Lamson Corporation of Delaware and its subsidiaries in New York and Boston.

Promoted to head Lamson Corporation as president is ROBERT I. HICKS, who has been vice president and marketing manager. He will continue as vice president of the parent company.

FRANCIS D. WEEKS, who has been

vice president and treasurer, is promoted to chairman of the board of the operating and manufacturing corporation. He will also continue as vice president and treasurer both of the parent company and of the Syracuse subsidiary.

As new president, MR. HICKS brings to the company considerable professional experience. A native of SAVANNAH, GEORGIA, he was graduated from the U. S. Naval Academy at Annapolis in 1923. Mr. Weeks, the new chairman of the board, is a native of Omaha, Nebraska, and was graduated from Williams College in 1917.

Wagner Electric—Atlanta

WAGNER ELECTRIC CORPORATION, ST. LOUIS, MO., announced the retirement of L. C. BARTON, Manager of the company's Electrical Division Branch Office in ATLANTA, GEORGIA, and the appointment of W. H. PREWITT, JR., to succeed him.

Mr. Barton joined the Wagner company in 1934 as a transformer specialist, and became manager of the Atlanta Branch in 1938. Mr. Prewitt started as a student engineer in 1935, and went to Wagner's Cincinnati branch as a salesman the following year. He was transferred to the Atlanta branch early in 1951.

U. S. Rubber—Hogansville, Ga.

The appointment of JOHN W. ALEXANDER as industrial relations manager of UNITED STATES RUBBER COMPANY's plants in HOGANSVILLE, GA., has been announced by A. C. LINK, plant manager.

Mr. Alexander has been with the rubber company since 1946. He is being transferred to Hogansville from Winnsboro, S. C., where he served as employment supervisor for the company's Winnsboro Mills. In his new position he will serve as industrial relations manager for Stark Mill, Reid Mill and the Asbeston plant at Hogansville.

Allis-Chalmers—Southwest

JOHN J. O'RYAN and NORMAN S. CASS are newly named sales representatives to ALLIS-CHALMERS general machinery division offices in the Southwest.

O'Ryan, a civil engineering graduate of the University of Colorado, has been named to the DALLAS district office.

Cass, an industrial engineering graduate of Oklahoma A. & M. College, has been assigned to the OKLAHOMA CITY branch office.

Taylor Forge & Pipe Works—Houston

The recent addition of Mr. GALE CARROLL to the company's HOUSTON District Sales Office has been announced by TAYLOR FORGE & PIPE WORKS.

Mr. Carroll, a resident of Texas for the past 15 years, formerly served as sales and advertising manager for Tube-Kote, Inc.

Casper Heads New A-C Dept.

Combining of the electrical and mechanical power departments of ALLIS-CHALMERS MANUFACTURING COMPANY into a power department under the management of R. M. CASPER has been announced. Casper had been manager of Allis-Chalmers electrical department since 1949. He joined the company in 1936.

Ferguson to Build Houston Plant

A contract to construct a new \$1,000,000 plant to produce ferromanganese, ferrosilicon and other alloys vital to the manufacture of steel has been awarded to THE H. K. FERGUSON COMPANY, industrial engineers and builders, by the newly-formed TENN-TEX ALLOY AND CHEMICAL CORPORATION.

The plant will occupy a 15-acre tract of land on the HOUSTON SHIP CHANNEL. It will consist of two parallel buildings, each approximately 50 by 368 ft, and several smaller buildings. Total floor space will approximate 40,000 sq ft. The plant will be equipped with three electric furnaces and will produce approximately 2,000 tons of refined metals a month.

The Tenn-Tex plant will import approximately 5,000 tons of manganese ore a month through the Port of Houston from Cuba, India, South Africa, Mexico and South American countries. Other raw materials including limestone, coke and steel scrap will come from TEXAS.

Shell Chemical—Houston

In a move aimed at alleviating the critical shortage of sulfur and its most important compound, sulfuric acid, SHELL CHEMICAL CORPORATION will add to its HOUSTON operations a unit for recovering sulfur from waste refinery gases.

Sulfuric acid, or oil of vitriol, is so fundamental a chemical with so many varied commercial uses (chemicals, oil, steel, paper, fertilizers, paints, to cite a few), that its total consumption provides a pertinent index of the industrial activity of any nation.

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No. 33 for steam or air service—sizes from $\frac{1}{8}$ " to $\frac{3}{4}$ ". Reduced pressure ranges 2-20; 20-40; 40-100 psi. Maximum working pressure 200 lbs.

No. 227 for water service — sizes $\frac{1}{4}$ " to 2". Reduced pressure ranges 10 to 60 psi. Maximum working pressure 150 psi. Also available for air service from $\frac{1}{4}$ " to 1".



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WHAT'S
THE BEST WAY TO
STRIP PAINT FROM
METAL PARTS TOO
LARGE TO
BE SOAKED
IN TANKS?

See Page 3

how to
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PAINT**

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Oakite's New FREE Booklet on Paint Stripping

answers many questions that will lead you to better stripping procedures. You'll want to read more about:

What's the best way to strip large areas of structural metal where a steam supply is available? See page 5.

What is the best method when steam is not available? See page 7.

What is the cheapest way to strip metal parts in large volume? See page 9.

What are the best ways to prepare stripped surfaces for repainting? See page 11.

What strippers are best for removing oil-base paints? ... Synthetic enamels, alkali-resistant plastics or resin-based paints? ... Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas? See page 12.

FREE For a copy of "How to STRIP PAINT" write to Oakite Products, Inc., 23A Thames St., New York 6, N. Y.

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news of the South and Southwest (continued)

Westinghouse Supply—Atlanta, New Orleans

Two recent appointments have been announced in the southeastern district of the WESTINGHOUSE ELECTRIC SUPPLY COMPANY.

CHARLES E. RYLEE, located in ATLANTA, GA., has been appointed assistant sales promotion manager for consumer products, and LEON J. PREJEAN has been appointed sales promotion manager for the local branch in NEW ORLEANS, LA.

Mr. Rylee is a graduate of Emory University. He joined Westinghouse in 1949 and has served in the stores and sales departments.

Mr. Prejean was graduated from Loyola University in 1950. While attending the university, he did advertising research work for several local firms. He also worked for the New Orleans Credit Men's Association.

The supply firm is the national wholesale marketing outlet for the Westinghouse Electric Corporation and for many other manufacturers of home appliances, electric apparatus and supplies.

Mumford Receives Percy Nicholls Award

ALBERT R. MUMFORD, research engineer for COMBUSTION ENGINEERING-SUPERHEATER, INC., received the Percy Nicholls' Award on October 11 at the Fourteenth Annual Joint Fuels Conference sponsored by the FUELS DIVISION of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS and the COAL DIVISION of the AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS. A. W. Thorson, supervising engineer of United Engineers & Constructors, Inc., made the presentation of the award, which was established in 1942 to recognize "notable scientific or industrial achievement in the field of solid fuels."

Union Carbide & Carbon Appoints Southerner

ADGER S. JOHNSON has been appointed President of NATIONAL CARBON COMPANY, a Division of UNION CARBIDE AND CARBON CORPORATION. He has been vice-President and General Manager of National Carbon Company since May, 1950.

Mr. Johnson was born in CHARLESTON, SOUTH CAROLINA, and grew up in BLACKSBURG, VIRGINIA. Here he

also attended Virginia Polytechnic Institute, which awarded him a degree in Chemical Engineering in 1928. Upon graduation he entered the employ of National Carbon Company.

Minneapolis-Honeywell Promotes Sisson

WILLIAM H. SISSON has been named power industry manager for MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, it was announced by the Brown Instruments Division.

Sisson will promote product sales in the central station and power fields. He will make his headquarters at Philadelphia.

Fricke Joins Superior Combustion Industries

GEORGE A. FRICKE, formerly with the Grisco-Russell Co., has joined the executive staff of SUPERIOR COMBUSTION INDUSTRIES, INC., as manager of the Heat Exchanger Division.



George A. Fricke, new manager of heat exchanger division of Superior Combustion Industries.

Mr. Fricke will direct the activities of his department from the executive offices of the Company in the Times Tower Building, Times Square, New York City.

Dearborn Chemical Co.—N. C., S. C.

DEARBORN CHEMICAL COMPANY has announced the addition of ROBERT G. GERSTMAYER to its sales staff. Gerstmayer will cover NORTH and SOUTH CAROLINA with headquarters in CHARLOTTE, N. C.

For the past three years, Gerstmayer has been a District Sales Engineer with Johns-Manville. Prior to this, he was with the Shell Oil Co. and Wright Aeronautical Corp.

Books for the Plant Engineer

Pile Foundations

By ROBERT D. CHELLIS.

PUBLISHED BY MCGRAW-HILL BOOK COMPANY.

327 West 41st St., New York 18, N. Y.

681 pages.

Price, \$12.50.

"Pile Foundations" is a one-volume encyclopedia of practical information on the selection, design, driving and maintenance of these engineering structures.

Chapters include: Basic Principles of Pile Foundations; Pile-driving Analysis; Hammer Speeds, Strokes, and Driving Stresses; Driving Equipment; Selection of Pile and Methods of Driving; Pile Grouping and Spacing; Structural Design of Piles; Wood Piles; Concrete and Pipe Piles; Caisson-type Piles and Caissons; H-Piles and Other Metal Piles; Sheet Piling; Deterioration and Preservation; Solidification of Soils; Pile Load Tests; and Failures of Pile Foundations. This last chapter, fully illustrated, describes sixty individual cases of serious failures of pile foundations and discusses the causes, methods of prevention and remedies for each situation.

The author presents useful tabulated data on temporary compression figures; on operating hammers, extractors and related equipment; on frictional resistance in various soil conditions, and on the various structural materials used. Standard specifications established by leading technical societies, manufacturers and engineers are also included.

Standards of Heat Exchange Institute—Barometric and Low Level Jet Condensers

PUBLISHED BY HEAT EXCHANGE INSTITUTE.

122 East 42nd St., New York 6, N. Y.

8½ x 11 inches—23 pages.

Price, \$1.00.

"Barometric and Low Level Jet Condenser Standards" (Third Edition, 1951) includes standard nomenclature, types, design, definitions, condenser performance, condenser performance calculations, construction, vacuum pump capacity, installation, atmospheric relief valves, air-water vapor mixture data, and pressure-temperature conversion tables.

Stainless Steel Handbook

PUBLISHED BY ALLEGHENY LUDLUM STEEL CORPORATION.

2020 Oliver Bldg., Pittsburgh 22, Pa.

8 x 11 inches—120 pages.

Obtainable free on request to manufacturer.

This new handbook on the stainless steels is being distributed free to users of the heat and corrosion resistant metals by the Allegheny Ludlum Steel Corporation. It consists of on-the-job reference data for fabricators and design engineers.

Approximately 40 different types of the company's stainless steel are covered from the standpoints of analysis, fabrication, heat treatment and special conditions of service. Separate chapters are devoted to discussions of heat resistant properties and low temperature properties of the metals.

Transients in Power Systems

By HAROLD L. PETERSON.

PUBLISHED BY JOHN WILEY & SONS, INC.

440 4th Ave., New York 16, N. Y.

6 x 9 inches—361 pages.

Price, \$6.50.

"Transients in Power Systems" summarizes a large amount of useful data about electric transients, particularly those of an over-voltage nature. The information is presented in the form of curves which can be used immediately with only minor calculations.

The author does not restrict his attention to the rigorous mathematical circuit-theory approach. He discusses what the analysis discloses and what conclusions can be reached which will be of help to the designer.

Welding Principles for Engineers

By JOE LAWRENCE MORRIS.

PUBLISHED BY PRENTICE-HALL, INC.

70 Fifth Ave., New York 11, N. Y.

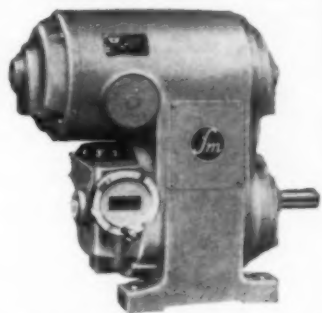
6 x 9 inches—511 pages.

Price, \$7.00.

The entire treatment of "Welding Principles for Engineers" is from the engineering standpoint. It covers such important topics as metal spraying, flame hardening, stud welding, flux cutting, brazing welding, and many other new processes. The first chapter is devoted to metallurgy.

Subsequent chapters cover a survey of the welding processes; testing and inspection of metals; welding of com-

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Speed Control Necessary For:

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- **TIME CONTROL OF:** Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.
- **EQUIPMENT ADAPTATION TO:** Load variation—sequence synchronization. Size—tension—hardness or shape of materials to be processed—machined—conveyed—blended—mixed—etc.
- **VARIATIONS IN:** Quality—quantity—operators' abilities—etc.

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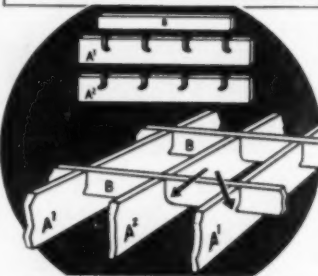
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merical metals; braze welding, brazing, soldering; surfacing; filler materials; oxygen cutting; stress and distortion; design for welding; and factors affecting welding production economy.

Water Treatment

By ESKEL NORDELL.

PUBLISHED BY REINHOLD PUBLISHING CORPORATION.

330 W. 42nd St., New York, N. Y.

260 pages.

Price, \$6.50.

"Water Treatment" for Industrial and Other Uses provides an exhaustive, practical and up-to-date reference work on the conditioning and

treatment of water supplies for industrial and domestic uses. It deals with their impurities (chemical compounds, suspended solids, color, odor, taste) and the methods of treatment to fit them for a great variety of uses.

The text covers water requirements; current water treatment practices in various industries; problems and practices relating to boiler feedwaters and cooling waters; processes and equipment used in treating water; water-softening processes; chemical reactions and methods of analysis.

Basic principles involved and solutions to specific problems are covered for the use of executives, consultants, engineers, chemists, operating personnel and students.

Catalogs and Bulletins

(Continued from p. 18)

For more data circle item code number on the postage free post card—p. 17

B-10 CONDUIT AND CABLE FITTINGS

—Bulletin No. 65, 64 pages—Lists electrical conduit fittings and cable fittings for all types of raceways including locknuts; bushings; elbows; pipe straps; conduit supports; connectors and couplings for rigid conduit, for EMT, for armored cable, for non-metallic sheathed cable and for service entrance cable; grounding equipment; service entrance fittings; floor boxes and junction boxes; tubelets; and bending tools. Illustrated.—THOMAS & BETTS CO., INC., Butler St., Elizabeth, N. J.

B-11 REFUSE OR COAL BURNING

STOKERS—Catalog No. 605, 24 pages—"Burn Refuse or Coal, separately or in combination, Detroit Stokers" illustrates and describes the company's Rotastoker of the stationary grate type for small boilers; hand-dumping grate type for small and medium boilers; power-dumping grate type, also for small and medium boilers; and spreader stokers. Includes typical application photographs and engineering data.—DETROIT STOKER COMPANY, General Motors Bldg., Detroit, Mich.

B-12 FOUR-CYCLE DIESEL

—Bulletin 191, 12 pages—Describes and illustrates the Supairthermal engine, a four-cycle Diesel. Dual-fuel or spark-fired gas unit with the ability to produce, in any given size, one-third more horsepower than the conventional turbo-charged engine. Illustrated.—NORDBERG MANUFACTURING CO., Milwaukee 7, Wis.

B-13 ENGINEERING SERVICES

—Catalog, 44 pages—"Organization and Services" lists types of services offered, including: engineering, design and construction supervision; special engineering studies and reports; chemical laboratory; engineering inspections and test work; management; public utility research; industrial relations; industrial research; purchasing; industrial safety; and cost and tax accounting. Installation photographs.—GILBERT ASSOCIATES, INC., 412 Washington St., Reading, Pa.

B-14 STEAM GENERATORS

—Catalog, 16 pages—Describes and illustrates construction and operational features of Superior Steam Generators. Fold-out cover shows photographs and cut-away schematic drawings. Charts give engineering data, dimensions, specifications, and test results.—SUPERIOR COMBUSTION INDUSTRIES, INC., 1475 Broadway, New York 18, N. Y.


B-15 TOTALLY-ENCLOSED MOTORS

—Catalog, 8 pages—"Safe Totally-Enclosed and Explosion-Proof U. S. Motors" describes, and illustrates in color, types of motors for hazardous and non-hazardous

services. Design and construction features are explained. Typical installations are pictured.—U. S. ELECTRICAL MOTORS, INC., P. O. Box 2658, Los Angeles 54, Calif.

B-16 ELECTROPLATING ON STEEL

Booklet, 28 pages—"Four Good Steps Toward Better Electroplating on Steel" lists specific improvements that can be made in the average cycle for cleaning before electroplating, and describes four steps that are helpful in obtaining better cleaning of low-carbon and high-carbon steel.—OAKITE PRODUCTS, INC., 22 Thames St., New York 6, N. Y.



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B-17 MATERIALS HANDLING — Booklet, 34 pages—"The How Book of Cost Cutting Materials Handling" gives basic background material covering types of skids, pallets, and other industrial handling tools. Offers plan for evaluating present handling methods through engineering analysis similar to time and motion study. Includes charts and summary sheets for analysis.—**YALE & TOWNE MANUFACTURING CO.**, 11,000 Roosevelt Blvd., Philadelphia 15, Pa.

B-18 SYNCHRONOUS MOTORS — Bulletin 65B7644, 6 pages—Describes standard construction features of low speed, coupled-type, pedestal-bearing synchronous motors, in ratings approximately 100 hp and larger at 450 rpm or less. Suggests applications for direct-coupled drives with varied industrial equipment.—**ALLIS-CHALMERS MFG. CO.**, 254 S. 70th St., Milwaukee, Wis.

B-19 NICKEL ALLOYED CAST IRONS — Bulletin, "Ni-Resist Section," 26 pages—Describes eight types of austenitic nickel alloy cast irons that offer unique combinations of properties. Applications and comparative industrial service data are included. Illustrated with photographs, tables of properties and corrosion data.—**INTERNATIONAL NICKEL CO., INC.**, Dept. BZ, 67 Wall St., New York 5, N. Y.

B-20 EXPANSION JOINTS—Catalog No. 51, 49 pages—Contains over 75,000 possible combinations of bellows type expansion joints; and lists complete line of aircraft bellows and assemblies. Illustrates standard and special bellows assemblies used to take up expansion, contraction, and offset movements in pipes and conduits.—**SOLAR AIRCRAFT COMPANY**, 2290 Pacific Highway, San Diego 12, Calif.

B-21 WELDING ACCESSORIES—Catalog EW-164-S, 16 pages—Illustrates and describes complete line of arc welding accessories and supplies, including equipment and protective clothing.—**HOBART BROTHERS COMPANY**, Box EW-164-S, Troy, Ohio.

B-22 SCREW CONVEYORS — Catalog Section 290-B, 36 pages—Illustrates and describes screw conveyors in many types and assemblies for handling various materials. Typical applications for products and industries are listed. Dimensions, prices, diagrams, and photographs are included.—**FORT WORTH STEEL & MACHINERY CO.**, 3600 McCart St., Fort Worth, Texas.

B-23 VALVES—Valve Catalog 254—Includes details on three Hanna "Unitite" Valves. Discusses design and construction features, and operation of these hand-operated valves. Illustrated.—**HANNA ENGINEERING WORKS**, 1765 Elston Ave., Chicago 22, Ill.

B-24 INDUSTRIAL INSTRUMENTS — Catalog No. 15-16, 48 pages—Covers pH (hydrogen concentration), oxidation-reduction potential, and electrolytic conductivity, with information on equipment for these vital process variables. Explains fundamental operating principles, describes measuring systems, and details of components, as well as typical applications.—**MINNEAPOLIS - HONEYWELL REGULATOR CO. - BROWN INSTRUMENTS DIVISION**, Wayne & Windrim Aves., Philadelphia 44, Pa.

B-25 ADHESIVES AND COATINGS—Handbook, 8 pages—Gives data on adhesives, coatings, and sealers in product design and engineering. Offers field and laboratory assistance in solving adhesive problems. Sixteen design problems and solutions are illustrated and described.—**MINNESOTA MINING AND MANUFACTURING CO.**, 411 Piquette Ave., Detroit 2, Mich.

B-26 BOILER SERVICE VALVES—Bulletin E125, 22 pages—Illustrates and describes valves for boiler services, such as surface blow, bottom blow-off, water column blow-off and connections. Includes specifications, materials of construction and dimensions of each type.—**EVERLASTING VALVE CO.**, Dept. 45, 49 Fisk St., Jersey City 5, N. J.

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Here is the Davis diaphragm motor valve with pressure controller that gives you accurate control for pressure reducing, pressure relief or back pressure service on steam, air, or gas!

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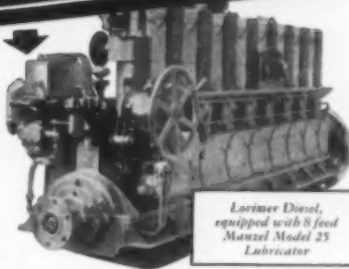
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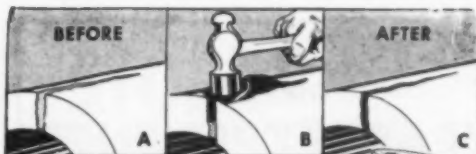
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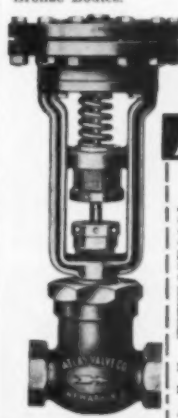
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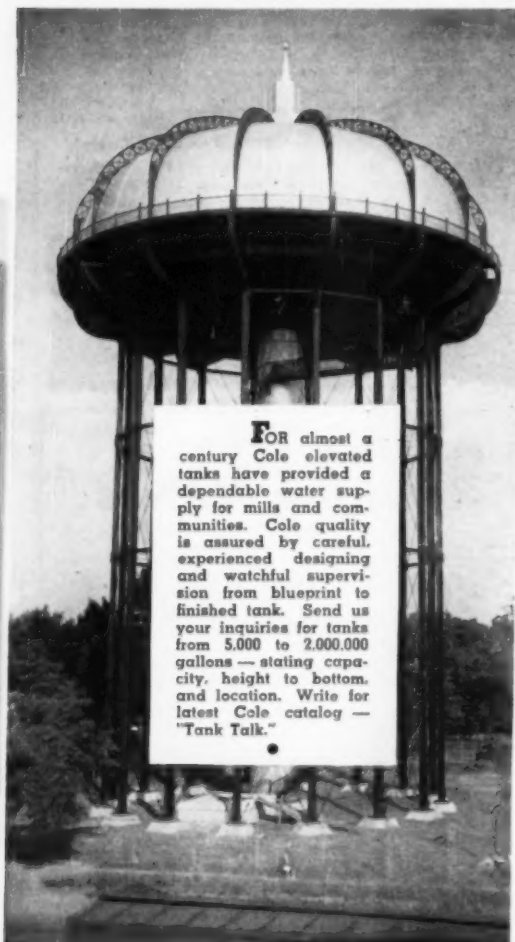
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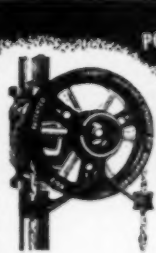
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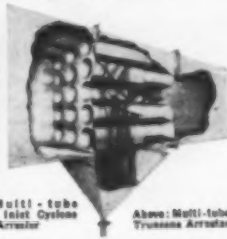
1 Babbitt Square, New Bedford, Massachusetts

STOP

FLY ASH NUISANCE



Left: Multi-tube Cyclone Arrestor

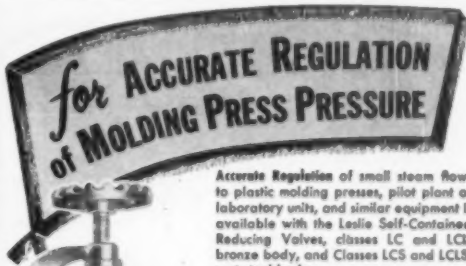


Above: Multi-tube Trussless Arrestor

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Reducing Valve

**for ACCURATE REGULATION
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- * CORROSION RESISTANT METAL DIAPHRAGMS
- * ENTIRELY ENCLOSED—NO STUFFING BOXES

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AIR HORNS • STEAM WHISTLES

ACCURATE

Low Cost
Temperature
Control

for Jacket Water
and Lube Oil



POWERS

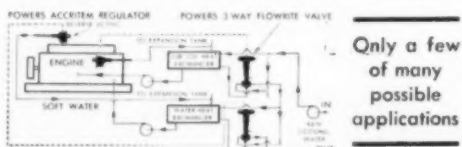
Compressed Air
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ACCREDITED REGULATOR

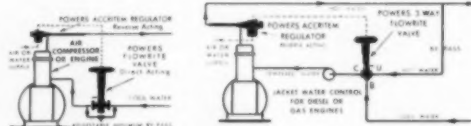
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(a62)



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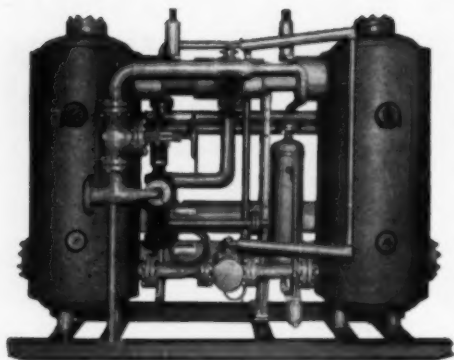
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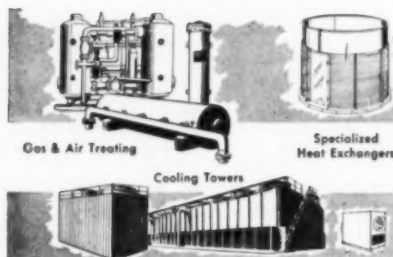
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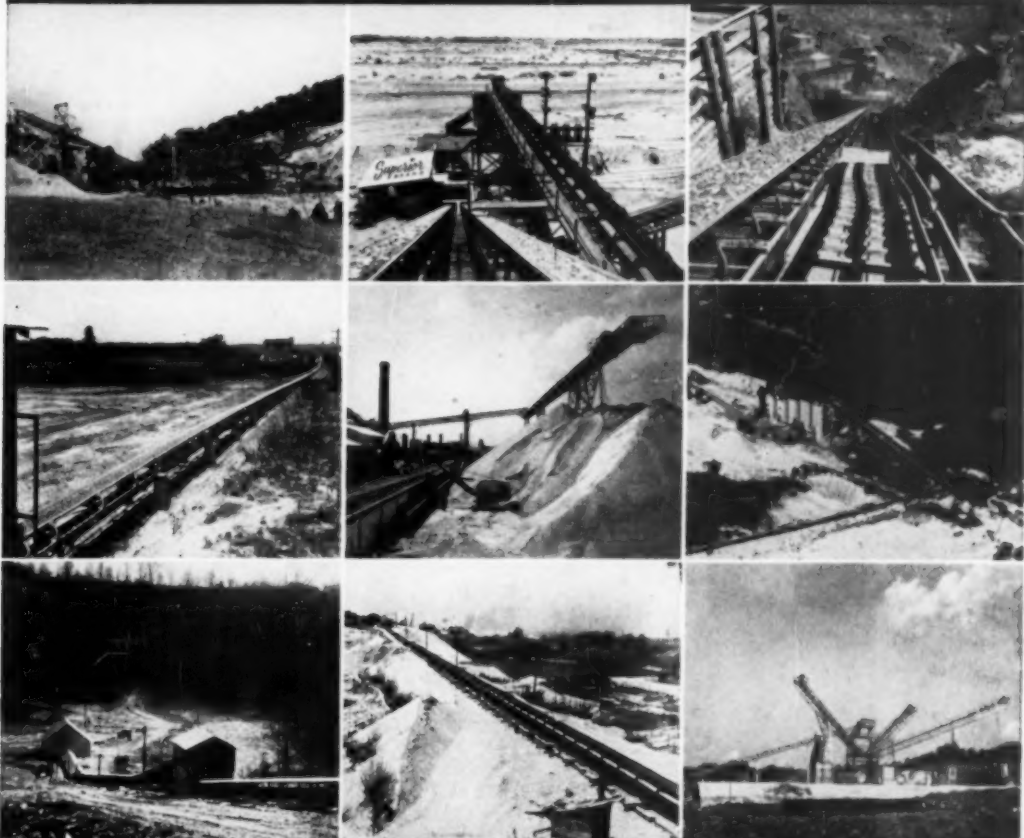
PITTSBURGH

STONE HANDLING!

These are tough jobs—requiring heavy equipment for long life and uninterrupted service.

That's why these operators specified

Continental



OTHER PRODUCTS: Screens, Feeders, Screw Conveyors, Pulleys, Tailrope, Buckets, Conveyors, Troughs and Turnouts.

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CONTINENTAL GIN COMPANY**

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DEAERATED COOLING WATER SAVES ONE COMPANY

\$85,500 a year!



THESE BASIC PROCESSES, PLUS PERMUTIT SKILL,
CAN SOLVE YOUR WATER CONDITIONING PROBLEMS



1. SLUDGE BLANKET HOT LIME SODA. Application of the sludge blanket to hot lime soda treatment reduces silica in boiler feed make-up, produces high quality steam.



2. HOT ZEOLITE—PERMUTIT Q. Subsequent treatment of water from hot lime soda treatment yields effluent of zero hardness. Permutit Q, or styrene base mineral resistant to high temperatures, replaces second stage phosphate treatment.



3. SILICA REMOVAL PLUS DEMINERALIZATION. Demineralization by cold ion exchange processes produces water comparable to distilled water only at a fraction of the cost of distillation. Treatment by anion exchange resin, Permutit S, reduces silica to less than 0.2 ppm.



4. DEAERATING HEATER. The Permutit Deaerating Heater, utilizing exhaust or bleed steam, prevents corrosion of feed lines, stage heaters, economizers, and boilers, by removing oxygen and free CO₂. Capacities from 12,000 to 1,400,000 pounds per hour are in service.



5. PRECIPITATOR. The Permutit Precipitator is used to lower alkalinity, reduce hardness, and help to remove turbidity, color, taste and odor. It can also be used to reduce silica.

**REDUCES CORROSION RATE 90%
PREVENTS TUBERCULATION
CUTS TUBE REPLACEMENTS
LOWERS WATER CONSUMPTION**

A chemical company in California installed a Permutit 5,000 gpm Vacuum Deaerator just over 2 years ago. Now here's what they have to say about it after exhaustive checking and comparison.

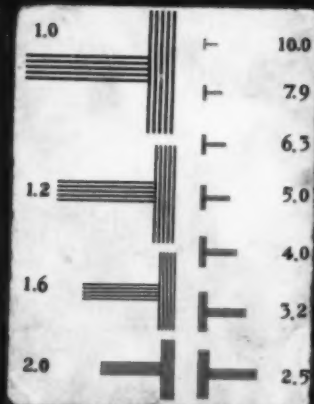
"The benefits occurring from water deaeration are difficult to calculate in their entirety, since so many of the advantages in small items such as clean water lines, better operation of valves, less frequent water line replacement and better water flow cannot be easily assessed. However, the major corrosion costs in this plant . . . have been determined and compared with the cost of deaeration . . ."

And the report goes on to cite actual net savings of \$85,500 per year resulting from the installation of a Permutit Vacuum Deaerator.

Find out how Permutit can solve *your* water problems. Write to the Permutit Company, Dept. SI-12, 330 West 42nd Street, New York 18, N. Y., or the Permutit Company of Canada, Ltd., 6975 Jeanne Mance St., Montreal.

PERMUTIT®
WATER CONDITIONING HEADQUARTERS FOR OVER 38 YEARS

RESOLUTION CHART



100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and $100/20 = 5$.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and $7.9 \times 5 = 39.5$ lines per millimeter recorded satisfactorily. $10.0 \times 5 = 50$ lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.

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